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Published by THE PENTON PUBLISHING CO. Penton Building, Cleveland, Ohio. E. L. SHANER, President and Treasurer; G. O. HAYS, Vice President; F. G. STEINEBACH, Secretary.

Member, Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers' Association.

Published every Monday. Subscription in the United States, Cuba, Mexico and Canada, one year $4, two years $6; European and foreign countries, one year $10. Single copies (current issues) 25c.

Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879. Copyright 1941 by the Penton Publishing Co.

STEEL

ESTABLISHED 1882

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HIGHLIGHTING
THIS ISSUE OF
STEEL

■ THE EXECUTIVE subcommittee of the Iron and Steel Industry National Defense Committee is expected to report this week **(p. 21)** on ways and means of meeting OPM's request for further steelmaking capacity to provide an additional 10,000,000 tons of ingots annually. To carry out this great program would require immense quantities of materials and a vast number of man-hours. It could not be executed without cutting sharply into civilian production and without interfering with defense production to a notable degree. In the trade it is regarded as unlikely the program will be undertaken in its entirety. However, further expansion in pig iron, coke and semifinished steel capacity are believed likely.

• • •

Preferences For Civilians

In the meantime it must be borne in mind **(p. 109)** that despite much talk on "steel shortages" for months past practically no shutdowns have occurred for lack of steel. There can be little doubt that existing facilities, with some rounding out as indicated above, can be made to do without the necessity of intolerable hardships to civilians, provided that there is effectual and intelligent control of the distribution of supplies. A far step in this direction is the OPM Priorities Division's order **(p. 40)** providing for extension of preference ratings to civilian as well as defense requirements. The new federal inventory control system, incidentally, has not yet **(p. 26)** proved workable.

• • •

Time For Firm Strike Stand

OPACS last week **(p. 34)** revised aluminum prices, **(p. 42)** placed nickel and other alloy scrap under price ceilings. . . . Copper **(p. 41)** now is under mandatory priorities control. . . . Conservation of petroleum products **(p. 34)** is recommended. . . . Strikes last week **(p. 27)** hampered defense production on an increasing scale and the impression grew that President Roosevelt soon must take a firm attitude; industry does not see a new law authorizing taking over of struck plants as the answer. . . . Railroad goal **(p. 34)** is 120,000 new freight cars in 1942, 150,000 in 1943. . . . Blast furnaces and coke ovens long inactive **(p. 49)** will go back into production. . . . Important new gage and tool plants **(p. 48)** are in production.

• • •

Shaping Sheets For Airplanes

Shaping sheet metal into airplane parts now is a subject of major interest; Otto Oetinger **(p. 57)** describes the Curtiss-Wright methods. . . . In his article this week **(p. 58)** Prof. Macconochie concludes his discussion of shell and bomb fuzes, now increasingly in production in this country. He analyzes recent German fuze patents. Incidentally, Prof. Macconochie wrote this article in the hope of "interesting some mechanical genius who will reduce the number of moving parts in the mechanical fuze". . . . B. L. Robinson and R. C. Pruitt **(p. 80)** discuss a new process which encourages repair and reclamation of high-chromium steel tools and dies; it permits annealing such steels in 20 to 30 minutes.

• • •

Employs 475 Subcontractors

Pratt & Whitney Aircraft Division reflects a fine example **(p. 84)** of what can be done in farming out work to subcontractors. It gets out its production with the help of 475 outside organizations who receive nearly 50 cents out of the company's sales dollar. . . . A new extinguishing agent for magnesium and incendiary bomb fires **(p. 83)** is announced. . . . Standardized steel siding formed from galvanized sheets now **(p. 70)** are being shipped in volume to army cantonments. . . . Psychology plays an important part in the effectiveness of safety work in steel plants, says Thomas Locke, who says **(p. 72)** it is a mistake to ridicule "careless workers". . . . Available **(p. 98)** is a new kit for testing industrial lubricants.

THERE'S "DOUBLE VALUE" in Inland Enameling Iron Sheets

ENAMELING iron sheets processed by the Inland method offer two great advantages—exceptional performance in the shop, and finer, more durable finished products.

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Steel Leaders Study Expansion Problem, Co-operating with Government

Increase in capacity proposed by Washington is more than that in decade of 1930-39, and greater than in boom period 1920-29 . . . Sheets, strip to be curtailed, mills used for plates . . . Half million tons steel allocated for shipbuilding

■ COMPLETE co-operation with the Office of Production Management's program to increase steel ingot capacity by 10,000,000 tons was assured by the industry's leaders last week. At week's end individual companies were surveying expansion possibilities and within a few days will prepare statements as to what they can do to increase capacity.

Data from the various companies will be consolidated and submitted to Washington for approval. This may be done the latter part of this week.

American Iron and Steel Institute may make a midyear survey of ingot capacity, as was done in 1937, and revise the basis on which steelworks operations are figured.

The proposal to ask the steel industry to plan to increase its capacity by 10,000,000 tons annually was formulated at a conference in Washington attended by B. F. Fairless, president, United States Steel Corp.; E. G. Grace, president, Bethlehem Steel Co.; Leon Henderson, administrator, Office of Price Administration and Civilian Supply; John Biggers, head of the production division, Office of Production Management; S. R. Fuller Jr., chief of the materials section, OPM; Jesse H. Jones, Secretary of Commerce and federal loan administrator; and James V. Forrestal, under secretary of the Navy.

Following the conference the OPM sent a letter to the executive subcommittee of the Iron and Steel Industry Defense Committee informing of the government's desire to expand capacity "in the shortest possible time."

The subcommittee was asked to canvass members of the industry to determine which companies can enlarge their plants and to report back to OPM at the earliest convenient date.

Companies desiring to participate in the plan were asked to submit information giving the tonnage capacity they believe they can add; the geographical location of this capacity; its cost; the finished products it would produce; time required for expansion, given proper priorities; estimated amount of steel required for such enlargements; and proposed methods of financing.

May Cost Billion

Conferees indicated the expansion should be made by enlarging existing plants and building new plants, if necessary, for existing companies. New organizations, such as that proposed recently by Henry L. Kaiser, West Coast engineer, will not figure in the program.

While the overall expansion may not reach 10,000,000 tons, the subcommittee is expected to submit a program based very nearly on that figure.

Changes in the supply and demand situation during the next few months may cause the plan to be revised.

Cost of the expansion, estimated by OPM spokesmen at between $800,000,000 and $1,000,000,000, will be financed by the Defense Plant Corp. Mr. Jones is reported to be in favor of the program.

Proposed expansion would exceed that accomplished in the decade of 1930-39 and that of 1920-29.

Gano Dunn, special consultant to the OPM, in his second report to President Roosevelt on the adequacy of steel capacity, estimated the cost of a horizontal expansion at $125 per ton of capacity. On this basis, the 10,000,000-ton expansion would cost $1,250,000,000, or considerably more than estimated by other government spokesmen.

It was indicated, however, that the proposed expansion would not be an entirely horizontal one, and could be accomplished more economically.

Mr. Dunn also pointed out that a 10,000,000-ton expansion would require: Ore mine development and equipment; railroad equipment, locomotives and cars; dock facilities, loading and unloading; 30 lake carriers; coal mine development; limestone development; 1200 by-product coke ovens; 18 blast furnaces; 100 open hearths; electric furnaces; rolling mills; finishing equipment; and electric power and drives.

Three million tons of finished

steel, or 4,160,000 tons of ingots, would be needed for the expansion.

The question posed to the President by Mr. Dunn was whether to divert the necessary steel and labor to expand capacity or whether civilian consumption should be restricted.

"It is during the next two years that we shall be passing through the period of our most critical demand for steel. The decision that must be made is whether or not, during that critical period, we shall abstract from the supply of steel 4,160,000 tons to give us an industry capacity 10,000,000 tons greater two or more years hence. It should be borne in mind that in abstracting such steel from other purposes to which it might be applied, we abstract not only the steel but the labor and raw materials that would then go into the production of all the other facilities earlier listed that make up a horizontal expansion of the steel industry."

Mr. Dunn also questioned the adequacy of the labor supply to operate the producing and consuming plants if steel capacity were increased 10,000,000 tons.

At the same time it was proposing the 10,000,000-ton expansion, OPM took formal steps to curtail the production of sheet and strip steel and to use rolling mill capacity thus released to turn out plates for shipbuilding, freight car building and other defense purposes. Production of sheet and strip for the automotive, refrigerator and other consumer goods industries will be continued to the extent that defense needs do not engage the available facilities.

Several weeks ago the automotive industry, at the request of OPM Chief Knudsen, agreed to reduce output by 20 per cent for the next model year.

W. A. Hauck, OPM steel consultant, last week visited several sheet and strip mills to determine what steps should be taken to convert the mills to plate production. Some already are equipped to turn out plates, as well as sheet and strip, he reported; considerable time will be required to install new equipment in other plants.

Plants visited by Mr. Hauck included the Jones & Laughlin Steel Corp. and Carnegie-Illinois Steel Corp. at Pittsburgh; Bethlehem Steel Co. at Buffalo; Great Lakes Steel Corp. at Detroit; Republic Steel Corp. at Cleveland; and Youngstown Sheet & Tube Co. at Youngstown, O.

Conservation Branch Established In OPM's Division of Purchases

WASHINGTON

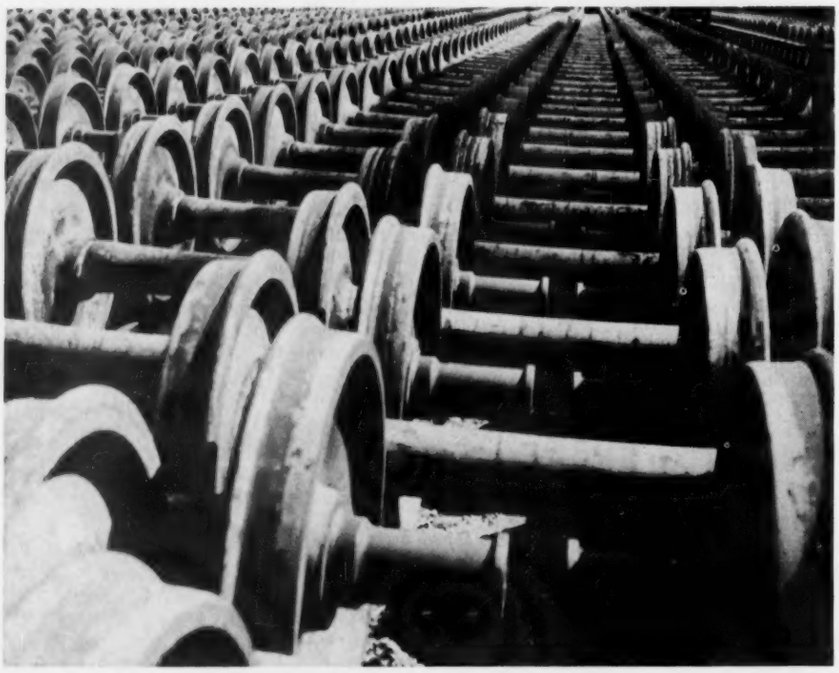
■ CREATION of a government conservation branch to be directed by N. F. Harriman of the Treasury Procurement Division, and C. L. Warwick, secretary, the American Society for Testing Materials, was announced last week by the OPM Division of Purchases.

The branch will attempt to conserve scarce materials in every way possible when supervising government purchases. A merchandise statistics branch, which will gather information with respect to market conditions, seasonal changes and timing of purchases, has been set up in the division and will be headed by Amos Parrish, New York merchandising consultant.

Also announced was a government requirements section to coordinate purchases of all government procurement agencies. George Livingston, former food supply director, National Defense Advisory Commission, will direct the section.

Other appointments to the Division of Purchases include: George A. Renard, National Association of Purchasing Agents, to be liaison officer between the division and OPACS; Prof. S. F. Telle and Prof. Austin Crimshaw, Harvard School of Business Administration, as consultants to Donald M. Nelson; Porter Savage, purchasing agent for Consolidated Edison Co., New York, to handle specific problems in industrial and strategic materials.

More Freight Cars Ordered Than in All 1940



■ **These wheels and axles assembled at Union Pacific's Omaha shops, and many thousands more like them, will be used in constructing 2250 box cars in those shops this year, and 2000 in 1942, at a cost of $14,000,000. Freight cars ordered in the United States in the first five months this year total 62,026, in contrast with 8698 in the period last year. For this year to date the total is 67,611, which is more than 66,880 ordered in the full year 1940. NEA photo**

Great Lakes Steel To Produce Light Plates

DETROIT

■ Great Lakes Steel Division of National Steel Corp., a leading producer of hot-rolled strip and sheets, is re-arranging and expanding its facilities to provide for annual output of 300,000 tons of light plates.

George R. Fink, Great Lakes president, says this is being done to help overcome the shortage in light plates, a bottleneck in construction of railroad cars and ships.

Mr. Fink expects that plate output can be started within six months by using a combination of present and new facilities, whereas at least 18 months would be required for construction of an entirely new mill.

OPM Allocates Half Million Tons Steel for Construction of Ships

WASHINGTON

■ OFFICE of Production Management last week allocated orders covering nearly 500,000 tons of steel under its program of placing defense tonnage where deliveries can be made most promptly.

This is the first allocation made by OPM since the Iron and Steel Industry Defense Committee was organized to expedite defense production by designating plants to which orders should be allocated for earliest delivery.

Orders placed in this initial allocation cover a total of 469,420 tons of steel to be used in the building of cruisers, subchasers, mine sweepers and cargo ships for the Navy and the Maritime Commission.

The companies which ordered the steel, purposes for which it was ordered, and the way in which the orders were allocated follow:

Consolidated Steel Corp. for building Maritime Commission cargo ships—Alan Wood Steel Co., Conshohocken, Pa., 3000 tons plates; Inland Steel Co., Chicago, 3000 tons plates; Otis Steel Co., Cleveland, 3320 tons plates; Bethlehem Steel Co., Bethlehem, Pa., 1600 tons shapes; Weirton Steel Co., Weirton, W. Va., 1000 tons shapes; Jones & Laughlin Steel Corp., Pittsburgh, 800 tons bars.

For Moore Dry Dock Corp. for building cargo ships for Maritime Commission—Inland Steel Co., 16,000 tons plates; Carnegie-Illinois Steel Corp., Pittsburgh, 10,000 tons plates; Jones & Laughlin Steel Corp., 7600 tons plates; Weirton Steel Co., 1000 tons shapes; Carnegie-Illinois Steel Corp., 4000 tons shapes, Phoenix Iron Co., Phoenixville, Pa., 2000 tons shapes; Inland Steel Co., 1000 tons shapes; Colorado Fuel & Iron Corp., Denver, 1000 tons shapes.

New York Shipbuilding Corp. for building naval vessels — Carnegie-Illinois Steel Corp., 12,000 tons plates; Bethlehem Steel Co., 13,000 tons plates; Lukens Steel Co., Coatesville, Pa., 12,000 tons plates; Worth Steel Co., Claymont, Del., 5000 tons plates; Carnegie-Illinois Steel Corp., 5000 tons shapes; Bethlehem Steel Co., 5000 tons shapes.

For British Iron & Steel Corp. for building cargo ships—Central Iron & Steel Co., Harrisburg, Pa., 20,120 tons plates.

Dravo Corp. for building naval vessels—Jones & Laughlin Steel Corp., 584.3 tons sheets.

For Commercial Iron Works for building naval vessels—Inland Steel Co., 369.4 tons plates and 517.5 tons sheets.

British Purchasing Commission—6910 tons of tin plate allocated among the following: Weirton Steel Co., 3130 tons; Bethlehem Steel Co., 750 tons; Jones & Laughlin Steel Corp., 1200 tons; Youngstown Sheet & Tube Co., 1150 tons; Follansbee Steel Corp., Pittsburgh, 380 tons; Granite City Steel Co., Granite City, Ill., 300 tons.

Sun Shipbuilding & Drydock for building tankers — Carnegie-Illinois Steel Corp., 85,000 tons plates and 32,400 tons shapes; Bethlehem Steel Co., 68,000 tons plates and 32,400 tons shapes; Worth Steel Co., 75,000 tons plates; Lukens Steel Co., 40,000 tons plates.

Orders were allocated by the plate, sheet, strip and tin plate sections of the Production Division, Materials Branch, OPM, after consultation with representatives of the industry and interested government departments and agents.

S. E. Hackett, chief steel consultant of OPM, and Paul E. Schucker, consultant of the plate, sheet, strip and tin plate sections, said the proximity of steel plants to firms needing the steel, the amount of business already on hand at the various mills and the size of plate that mills could roll were among the factors that were considered in making the allocation.

Factors to be taken into consideration by the OPACS in formulating policies and programs for allocation of iron and steel products among competing civilian demands were announced in a civilian allocation program for pig iron, ferroalloys, steel ingots and castings, and all carbon and alloy steel products.

Program carries out action agreed upon by Director of Priorities Stettinius and Mr. Henderson.

Current demand for such products under defense orders and for civilian purposes is greater than the ability of producers to deliver in the required amounts upon scheduled delivery dates. Therefore, it is held necessary that after military defense requirements are satisfied provision must be made for equitable allocation of remaining iron and steel products among competing civilian demands. In doing this, Mr. Henderson will take the following factors into consideration:

Need to provide adequately for civilian uses essential to the public welfare.

Degree of hardship upon labor or business resulting from failure to obtain deliveries when scheduled or from the rejection of orders.

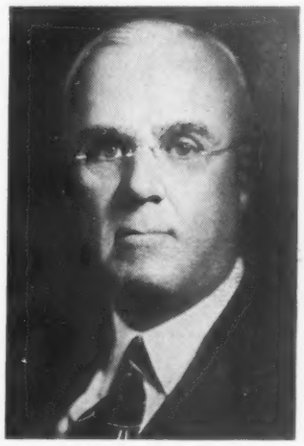
Past rates of consumption of the products by users.

Objective of achieving an equitable division of supplies of the products among all users.

Availability of substitutes for the particular uses for which the products are sought.

Policy of the administrator to refuse allocation to any person who in the conduct of his business discriminates against defense orders.

In Steel Fifty Years; Drops from Institute



Ernest T. Weir

■ Ernest T. Weir, chairman, National Steel Corp., Pittsburgh, last week confirmed his resignation as a member of the American Iron and Steel Institute and the withdrawal of the company from membership.

Mr. Weir served as president of the institute from May, 1939, through May, 1940, when he was succeeded by Walter S. Tower, formerly executive secretary. He was elected a director of the institute in 1928, and until last week was a member of the executive committee.

Mr. Weir, who has been associated with the steel industry for 50 years, founded the National Steel Corp. at the beginning of the depression and guided it through the lean years with a remarkable earnings record. It now is the fifth largest producer in the country.

He declined to discuss his reasons for withdrawing from the institute.

■ President Roosevelt last week asked Congress to appropriate $350,000,000 for widening and otherwise improving roads in strategic areas. He also requested an additional $25,000,000 to strengthen bridges now inadequate to accommodate the Army's rolling equipment.

Pig Iron Operating Rate in May Up 2.3 Points to 94.1%; 206 Stacks Active

■ PRODUCTION rate of coke pig iron in United States in May increased 2.3 points to 94.1 per cent of capacity as average daily output rose 2.5 per cent above April's, and total of stacks active at the end of the month showed a net gain of 15. Complete reports from operators of the nation's 229 potential coke blast furnaces showed 23 stacks out of blast, with several scheduled for rehabilitation and service soon.

Average daily output in May was 148,262 net tons, up 3577 tons or 2.5 per cent from April's average, 144,685 tons. Fourth highest for any month on record, daily average in May was exceeded only in each of the first three months this year. It compared with production of 112,811 tons daily in May, 1940; for the period in 1937, average was 128,083, and 140,843 for the month in 1929.

Total output for the month was 4,596,113 tons, 255,558 tons or 5.9 per cent more than 4,340,555 tons produced in the preceding month. This was third highest monthly total, exceeded only in January and March of this year, with 4,666,233 and 4,702,905 tons respectively.

May production was 31.4 per cent greater than in the month last year, 15.8 per cent higher than 3,970,602 tons produced in May, 1937, and up 5.3 per cent from total of 4,366,145 tons in the month in 1929. In the latter period 220 stacks were reported in blast.

Combined output in the first five months this year was 22,512,632 tons, 30.6 per cent greater than in the corresponding period last year and nearly double the aggregate for the January-May interim in 1939. In the period in 1937, total was 18,654,757 tons and 20,073,124 for the five months in 1929.

Daily average output for the five months was 149,090 tons, 31.5 per cent above the average of 113,392 for the period in 1940, and compared with 123,541 tons for the five months in 1937 and 132,935 tons in 1929.

Operating rate, 94.1 per cent, compared with 91.8 per cent in April and 96.3 per cent in March. In May, 1940, it was 74.2 per cent, 40.2 per cent in the month in 1939, and 84.3 per cent in May, 1937.

Merchant iron produced in May totaled 656,792 tons, against 3,939,321 tons nonmerchant, and was 16.7 per cent of the total. In April, percentage of merchant iron was 16.2, in March 17.8, and in February 14. Percentage in May, 1940, was 12.4.

Stacks in blast May 31 totaled 206, a net gain of 15 from April 30, and highest since August, 1929, when 209 were active and output was 4,195,742 tons. In March, 205 furnaces were reported in blast, 202 in February, 205 in January. Total in May, 1940, was 171, compared with 170 in the month in 1937 and 220 in May of 1929.

Two merchant stacks were blown in during the month and none were blown out or banked. In the steelworks or nonmerchant classification, two stacks were blown out and 15 added.

Stacks blown in during the month: In Alabama: Fairfield No. 5, Tennessee Coal, Iron & Railroad Co. In Illinois: South Works New Nos. 7 and 10, Carnegie-Illinois Steel Corp. In Indiana: Gary Nos. 3 and 4, Carnegie-Illinois Steel Corp. In New York: Harriet X, Wickwire Spencer Steel Co. Inc.; One Buffalo, National Steel Corp.

In Ohio: Mingo No. 4 and Ohio No. 1, Carnegie-Illinois Steel Corp.; One Lorain, National Tube Co.; One River, Republic Steel Corp.; Mary, Sharon Steel Corp. In Pennsylvania: One Shenango, Shenango Furnace Co.; One Monessen, Pittsburgh Steel Co.; Carrie Nos. 3 and 1, Edgar Thomson F, Carnegie-Illinois Steel Corp.

Furnaces banked or blown out: In Michigan: One Detroit, National Steel Corp. In Pennsylvania: Cambria L, Bethlehem Steel Co., blown out April 30 but not previously reported.

North Birmingham No. 3 furnace of Sloss-Sheffield Steel & Iron Co., in Alabama, was reported changed from ferromanganese to pig iron production.

PIG IRON STATISTICS

RATE OF FURNACE OPERATION
(Relation of Production to Capacity)

	1941[1]	1940[2]	1939[3]	1938[4]
Jan.	95.5	85.4	51.0	33.6
Feb.	95.3	75.0	53.5	33.6
March	96.3	69.5	56.1	34.2
April	91.8	68.9	49.8	33.4
May	94.1	74.2	40.2	29.4
June	....	83.6	51.4	25.5
July	....	86.1	55.0	28.2
Aug.	....	89.9	62.4	34.8
Sept.	....	91.5	69.7	40.5
Oct.	....	94.2	85.2	48.0
Nov.	....	96.4	90.3	55.0
Dec.	....	96.4	88.5	51.4

[1] Based on capacity of 57,503,030 net tons, Dec. 31, 1940; [2] capacity of 55,628,060 net tons, Dec. 31, 1939; [3] capacity of 56,222,790 net tons, Dec. 31, 1938; [4] capacity of 56,679,168 net tons, Dec. 31, 1937. Capacities by American Iron and Steel Institute.

MONTHLY IRON PRODUCTION
Net Tons

	1941	1940	1939
Jan.	4,666,233	4,024,556	2,436,474
Feb.	4,206,826	3,304,368	2,307,405
March	4,702,905	3,270,575	2,680,446
April	4,340,555	3,139,043	2,301,965
May	4,596,113	3,497,157	1,923,625
Tot. 5 mo.	22,512,632	17,235,699	11,649,915
June	.....	3,813,092	2,373,753
July	.....	4,060,513	2,638,760
Aug.	.....	4,234,576	2,979,774
Sept.	.....	4,172,551	3,218,940
Oct.	.....	4,437,725	4,062,670
Nov.	.....	4,397,656	4,166,512
Dec.	.....	4,542,864	4,219,718
Total	.....	46,894,676	35,310,042

MAY IRON PRODUCTION
Net Tons

	No. in blast last day of May	No. in blast last day of April	—Total Tonnages— Merchant	Nonmerchant
Alabama	18	17	120,187*	194,058
Illinois	18	16	106,375	344,651
Indiana	19	17	22,641	518,249
New York	15	13	91,005	190,576
Ohio	46	41	161,139	894,188
Penna.	66	62	123,605*	1,277,921*
Colorado	3	3		
Michigan	4	5		
Minnesota	2	2	28,460*	190,862
Tennessee	1	1		
Utah	1	1		
Kentucky	2	2		
Maryland	6	6		
Mass.	1	1	3,380*	328,816
Virginia	1	1		
West Va.	3	3		
Total	206	191	656,792*	3,939,321*

*Includes ferromanganese and spiegeleisen.

AVERAGE DAILY PRODUCTION
Net Tons

	1941	1940	1939	1938
Jan.	150,524	129,825	78,596	52,201
Feb.	150,244	113,943	82,407	52,254
March	151,707	105,502	86,465	53,117
April	144,685	104,635	76,732	51,819
May	148,262	112,811	62,052	45,556
June	.....	127,103	79,125	39,601
July	.....	130,984	85,121	43,827
Aug.	.....	136,599	96,122	54,031
Sept.	.....	139,085	107,298	62,835
Oct.	.....	143,152	131,053	74,697
Nov.	.....	146,589	138,883	85,369
Dec.	.....	146,544	136,119	79,943
Ave.	149,090	128,128	96,740	57,962

Koppers To Light One Granite City Furnace

■ Details of the sale of Granite City Pig Iron Co.'s plant at East St. Louis, Ill., to Koppers United Co., Pittsburgh, reported in STEEL, May 12, p. 51, were released last week by Ogden Corp. Subsidiary of Atlas Corp., the Ogden company is one of Granite City's principal stockholders.

Purchase price was approximately $650,000, of which about $388,520 will be used to pay off the bond issue of Granite City Pig Iron Co. Ogden Corp.'s holding, nearly 40 per cent of the stock outstanding, will be liquidated as a result of the sale.

Idle since 1931, the Granite City plant has two blast furnaces with a combined capacity of about 33,000 tons per month. Because of the de-

fense program and increasing need for pig iron, one stack will resume operations almost immediately, it is reported. The other can be made ready in a few weeks.

Coke for the first blast furnace operation will be furnished by Laclede Gas Light Co., St. Louis. Iron ore will be principally from the Lake Superior district. Substantial portion of the output, it is understood, will be sold as hot iron to Granite City Steel Co.'s nearby plant.

Bethlehem, Republic Set New Production Records

■ Bethlehem Steel Co., Bethlehem, Pa., set an all-time high production record in May with 1,040,000 tons. The prior high mark was in March, 1,024,026 tons. Operations in May averaged 103 per cent of capacity, with new high rates at Bethlehem, Lackawanna and Johnstown, while other plants came close to their records. Steel and iron shipments also reached an all-time high, including electric furnace steels, plates and structurals.

Republic Steel Corp. operated at 103.4 per cent of capacity in May, establishing new all-time ingot production records at its Chicago, Cleveland and Massillon open hearth plants. A new high also was established in the tonnage of electric furnace ingots produced at Canton, making a new total ingot production record for the Central Alloy District.

All previous records were eclipsed on the company's bar mills at Canton, Massillon and Youngstown, at Chicago and at Gadsden, Ala. Total production of bars for the corporation as a whole likewise established a new high.

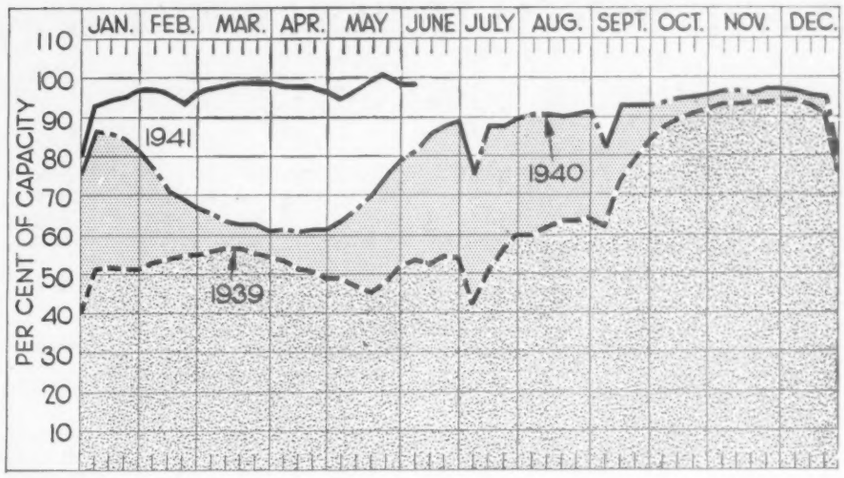
Every plant in the Union Drawn Steel Division hit new production highs. Three plants of the Steel & Tube Division also established new highs for a single month's output.

Says Abrasive Output Can Be Increased 50%

■ Production of artificial abrasives, essential to manufacture of guns, shells, airplanes, tanks and every product that involves metal forming and finishing, can be increased about 50 per cent over 1940 output without building new plants, according to the Bureau of Mines.

Reports from abrasives manufacturers indicate maximum production of artificial abrasives could be increased to 152 per cent of the 1940 output by overhauling production schedules. Nature of the industry, it is reported, is such that plant capacity could be expanded rapidly.

United States, asserts the bureau, could attain self-sufficiency in regard to all necessary abrasives excepting industrial diamonds, despite complete stoppage of sea-borne traffic.



PRODUCTION . . . . Steady

■ STEELWORKS operations last week held at 99 per cent, only slight changes being made in furnace operations. Two districts showed higher rates, two declined and eight were steady. A year ago the rate was 81½ per cent; two years ago it was 53½ per cent.

Youngstown, O.—Continued at 97 per cent for the third week, with 75 open hearths and three bessemers active. Schedule for this week is for the same rate. Youngstown Sheet & Tube Co. relighted a blast furnace after relining and Republic Steel Corp. will relight a stack this week after being idle since 1925.

Chicago—Regained 1 point to 101½ per cent, within 1 of the all-time high reached in May. Four of the six plants are at 100 per cent or higher. Blast furnace operation remains at 37 out of 40, two of the idle stacks being long inactive and no plans being made for rehabilitation.

Wheeling—No change was made, the rate continuing at 88 per cent.

Detroit—Steady at 92 per cent, two open hearths being down for repair. One interest has all its 16 furnaces in production.

St. Louis—Held at 98 per cent for the tenth week. One or more open hearths are scheduled for relining within the next ten days.

Cincinnati—Necessity for furnace repair reduced production 1 point to 91½ per cent.

Cleveland—Loss of 3 points to 93 per cent resulted from necessity for repairs. One open hearth is being rebuilt and capacity increased.

Buffalo—Steady at 93 per cent, with 40 of 43 open hearths in production.

Pittsburgh—Remained at 100½ per cent. Flood waters did not interfere with steelmaking, though some finishing mills curtailed.

Central eastern seaboard—Resumption by Phoenix Iron Co. after strike settlement caused the rate to increase 1 point to 97 per cent.

New England—Repairs to two open hearths held the rate at 90 per cent but an advance is scheduled for this week.

Birmingham, Ala.—Unchanged at 95 per cent for the fourth week. Tennessee Coal, Iron & Railroad Co. will take off one furnace this week, resulting in a drop of 5 points.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended June 7	Change	Same week 1940	Same week 1939
Pittsburgh	100.5	None	80	43
Chicago	101.5	+ 1	86	52.5
Eastern Pa.	97	+ 1	73	37
Youngstown	97	None	67	51
Wheeling	88	None	79	73
Cleveland	93	— 3	82	53
Buffalo	93	None	84	44
Birmingham	95	None	85	67
New England	90	None	60	40
Cincinnati	91.5	— 1	70	68
St. Louis	98	None	56	47
Detroit	92	None	75	57
Average	99	None	81.5	53.5

Show Machine Tools at Civic Defense Exposition

■ Machine tool manufacturers in Cincinnati and vicinity are co-operating in the Miami Valley Industry and Defense Exposition, in Music Hall, Cincinnati.

Displays of machine tools were set up by 16 makers, to show the public how these tools are the foundation of national defense.

Guns, ammunition, planes and other exhibits provided by the United States army form a major part of the show, sponsored as a civic institution.

Inventory Control System Creates Difficulties for Some Suppliers

PITTSBURGH

■ FEDERAL inventory control system, represented by the affidavits now being submitted by steel users to their suppliers, has not yet proved workable. Although it is still too early to draw definite conclusions, the immediate reaction has been varied.

In some instances sellers are hewing strictly to the line, and will not ship to customers who have not returned affidavits. This is particularly true in pig iron, ferroalloys, and similar products which are standard, and can be shipped to any one of a number of customers. They say customers who do not comply with the affidavit order will receive no further shipments.

On the other hand, suppliers of steel against strict specifications see considerable hardship in the affidavit sytem. Many of these products can be delivered only to the customer who ordered them, and if the affidavit does not come in on time the mill must provide storage space. This the mills cannot do easily, and in some instances it has been decided to ship regardless of the affidavit.

Steel suppliers are unable to verify information contained in the affidavits and many sellers suspect all are not bona fide. No practical means have been set up as yet to check the thousands of statements regarding consumers' inventories, so for the present this is "meaningless, except for additional bookkeeping."

Steel & Wire Interprets the Order for Its Customers

American Steel & Wire Co., last week, sent to its customers the following statement:

"We are enclosing herewith copy of

(a) General Metals Order No. 1, issued by the Division of Priorities, Office of Production Management, Washington, May 1, 1941.
(b) Form of Customer's Sworn Statement, Form PD 19A.
(c) Form of Supplier's Statement, Form PD 19B, which forms (b) and (c) are referred to in (a).

"The above order and the forms to be filed pursuant thereto are designed to restrict inventory accumulation of certain metals specified in the order. As the order states, customers as defined in the order are to file a sworn statement, PD 19A, with each supplier as defined in the order and the Director of Priorities, Washington, on or before the 10th day of each month, commencing June 10, 1941.

"If you received deliveries during May of any of the materials listed in the order you are by the order required to file 'Customer's Sworn Statement' on or before June 10; or if you received no deliveries of any such materials in May but want delivery subsequently, you are required, before you get delivery, to file one copy of 'Customer's Sworn Statement' with the Division of Priorities and one copy with us, as Supplier.

"You will note from 'Supplier's Statement' (form PD 19B) that we are required to withhold deliveries unless customers comply with General Metals Order No. 1, and to report to the Director of Priorities, when Customer's Statements are not duly filed, as well as to furnish, among other things, any data concerning deliveries and orders upon request of the Priorities Division.

"We suggest that, assuming that we made shipment to you on or subsequent to May 1, 1941, and during the effective period of the above government order, you send us at above address the sworn statement referred to above (copy to Director of Priorities, Office of Production Management, Washington, in every case) on the first day of each month; that is, 10 days in advance of the filing date required in order to enable us to comply with the order and to avoid any possibility of suspension of shipments or delay in delivery."

Many National Defense Subcontracts Available

CHICAGO

■ OPM is currently urging that more production be given to subcontractors to speed up the defense program. Smaller manufacturers indicate a desire to engage in such work as their normal business shrinks from inability to obtain adequate supplies of materials, but complain of difficulty in booking subcontract defense business. Apparently one of the drawbacks is in bringing primary contractors and potential subcontractors together.

That numerous opportunities exist for subcontractors is illustrated by the following examples, cited by T. S. McEwan, district manager, Defense Contract Service, Federal Reserve Bank, Chicago:

A Chicago manufacturer wants subcontractors to machine steel parts accurately. Equipment needed: Engine lathes, boring mills and turret lathes.

An Indiana manufacturer wants subcontractors for work on 35 millimeter gun carriages.

An Illinois manufacturer requires facilities for completely fabricating large machine tools similar to drill presses of welded steel construction.

A Missouri manufacturer wants subcontractors to produce small dies, tools and gages.

An Illinois manufacturer wants subcontractors to produce plug gages, snap gages and thread gages.

A Chicago manufacturer wants to purchase good used machine tools, and also desires subcontractors for screw machine products, milling machine work and other products.

A Connecticut manufacturer wants subcontractors to produce a large volume of small accurate screw machine and milling machine products.

According to Mr. McEwan, there is urgent demand throughout the entire Middle West for subcontractors on all sizes of automatic screw machine products.

MEETINGS

Marketing Symposium In Detroit, June 13

■ DETROIT manufacturers and industrialists will join with the Adcraft Club in a half day's "Industrial Emergency Marketing Symposium" in Hotel Statler, June 13, sponsored by the Industrial Marketers of Detroit. Mason Britton, division chief of the OPM, Washington, will be the principal speaker at the noon luncheon. His subject will be "The Four Ms—Money, Munitions, Manpower and Minutes."

"The purpose of the symposium," says Forrest U. Webster, general chairman of IMD, "is to bring together the manufacturers in all leading industries in the vicinity of Detroit, and their more important customers, for a discussion of selling and distribution problems which will face all industry and business when the war emergency is over and the national defense program is completed or has been greatly reduced."

Electrical Engineers

Summer convention of the American Institute of Electrical Engineers will be held in Roval York hotel, Toronto, June 16-20. Several plant inspection trips are planned.

Society for Testing Materials

Data dealing with effects of low temperatures on metals will be presented at the session on steel, forty-fourth annual meeting of the American Society for Testing Materials, Palmer House, Chicago, June 23-27. A new free-machining stainless steel also is to be discussed.

Defense Industry Strikes at Peak; Administration Action Awaited

■ STRIKES and unauthorized work stoppages continued to hamper production of national defense materials last week in the face of the President's declaration of an unlimited emergency and demand for greater and uninterrupted production.

Indicating the trend of labor disputes, the Department of Labor reported that strikes in April involved four times as many workers and caused five times as many man-days lost as in March. Four hundred new strikes broke out during the month, 500,000 workers were affected, and lost 7,800,000 man-days of employment. About two-thirds of the idleness was caused by the soft coal strike.

The Defense Mediation Board recommended the elimination of the 40-cent daily wage differential between northern and southern mines, and the establisment of a $7 daily wage. Southern operators granted workers a $1 daily increase in April when the soft coal strike ended. The United Mine Workers insisted on elimination of the differential but agreed the miners should return to work while negotiations continued. During the wage negotiations, UMW President John L. Lewis has threatened to call out both southern and northern miners on a new strike, which would paralyze the iron, steel and other defense industries.

North American Aviation Inc., Inglewood, Calif., which has been producing more than one-fifth of this country's airplanes, was closed by a strike of United Automobile Workers (CIO). Walkout was unauthorized by the union's top officials and some members complained to the Office of Production Management that the strike was directed by radical labor leadership.

Steel Plant Struck

Great Lakes Steel Corp., Detroit, unit of National Steel Corp. which took the initiative in granting a 10-cent hourly wage increase to steelworkers in April, was struck in the strip mill, cold mill and merchant mill. Strikers demanded an additional increase of 7 cents an hour, time and a half for overtime and double time for Sundays. Work was resumed after 24 hours on the promise of Federal Conciliator James F. Dewey that the workers would receive "a contract as good as any."

On the West coast, shipyard workers were filtering back to the yards despite union picket lines. The strike, called in defiance of a recently signed agreement, was believed virtually broken when 12,000 of the 15,000 workers normally employed returned.

At Pittsburgh, local steel deliveries were tied up by a strike of the Central Teamsters Union, American Federation of Labor affiliate. Many truckloads of steel, machinery and other materials were diverted into parking lots and placed under union guard. One truck, loaded with castings, was pushed into the Allegheny river.

Twelve thousand striking lumbermen on the West coast were urged to accept the Defense Mediation Board's recommendations for returning to work by CIO President Philip Murray. Mr. Murray denounced the local leadership and told the strikers the local officers had "indulged in a campaign of misrepresentation, slander and abuse."

While a drumfire of criticism over the administration's handling of strikes continued in Washington, high defense officials estimated that more than 50,000 workers were on strike in companies having defense orders. This, they said, was the greatest number striking since the first of the year, excluding the bituminous coal strike.

"Greatest Threat To Aircraft Production"

■ Strikes, more than any other factor, can disrupt the aircraft production program so seriously as to render United States aid in this war too little and too late. This was the warning voiced by Col. John H. Jouett, president, Aeronautical Chamber of Commerce of America Inc., before a luncheon meeting of the National Aeronautic Association in annual convention in Louisville, Ky., last week.

However, he predicted, if our aircraft production continues to rise without interruption, American planes will arm the democracies to the extent of assuring victory.

Increasing long-range bomber output will make it possible to establish a protective patrol over a route 200 miles wide across the Atlantic.

■ Rapidly increasing employment during 1940 was not accompanied by the expected increase in industrial accident rates, according to the National Safety Council, Chicago. Last year's fatality rates of companies reporting to the council were 2½ per cent below 1939, indicating the safety-conscious companies were able to take employment gains in stride.

The steel industry was fourth among 30 industries in accident frequency, although it had an average increase of 12 per cent during 1940. In severity, the steel industry ranked 24th, with an 8 per cent increase in 1940 over 1939.

April Steel Payrolls, Employment at New Peak

■ Steel industry payrolls in April exceeded $103,557,000, an increase of more than $10,500,000 over March, according to the American Iron and Steel Institute. Sharp rise reflects the 10-cent increase in hourly wages which became effective April 1.

Previous payroll record was established in March this year at $98,025,000.

Employment likewise rose during the month, establishing a new peak at 621,000, or 8000 over the previous record of 613,000 first recorded in the summer of 1937 and again in March this year.

A year ago, in April, 1940, an average of 503,000 was employed and payrolls totaled $37,724,000.

Hourly earnings of wage earners averaged 97.4 cents an hour in April, compared with 87.7 cents in March before the increase went into effect. In April, last year steel wage earners received an average of 83.6 cents an hour.

The work-week in April averaged 39.4 hours per week, against 38.5 hours in March. and 33.4 in April, 1940.

British Razor Blades Find "Huge Overseas Market"

LONDON

■ A huge overseas market for razor blades has been developed by Great Britain since the war began, in a field which up to then had been largely in the hands of Germany.

Thirty-three British manufacturers sent overseas throughout 1940 an average of 1,125,000 blades a day. The enormous total of 456,250,000 blades would, end to end, run to 12,600 miles. The value of the exports is £700,000 a year.

One reason is that they have stopped making the blade holed to fit only a particular make of safety razor. Most of their blades now are of the three-hole "universal" type.

Strip steel used is made on rolling mills engaged on war production, yet manufacturers have been able to secure enough material to develop their industry. Editor's note: Data from Cricklewood Razor Blades Ltd., Humber road, N. W., London.

MEN of INDUSTRY

Norman F. Tisdale

Melvin C. Harris

Carl B. Pollock

George W. Evans

■ **A. F. DOHN,** vice president in charge of tool steel sales, Allegheny Ludlum Steel Corp., has retired. He will, however, continue in a consulting capacity as a vice president.

In a move to correlate more closely production facilities of the two Allegheny Ludlum plants in the Pittsburgh district, at Brackenridge and West Leechburg, **Melvin C. Harris** has been appointed to the newly created position of district manager. Mr. Harris' entire career has been with Allegheny Ludlum, beginning as a clerk in Allegheny's plate mill in 1915. In 1938 when Allegheny and Ludlum Steel interests were merged, he became general manager at Brackenridge.

Carl B. Pollock succeeds Mr. Harris as manager at Brackenridge. He joined the former Allegheny Steel Co. as superintendent of No. 2 department at Brackenridge in February, 1932, subsequently becoming assistant general superintendent, and general superintendent.

George W. Evans, since 1940 assistant general superintendent, Brackenridge plant, has been promoted to general superintendent there, succeeding Mr. Pollock. Mr. Evans joined the former Allegheny Steel Co. in 1909.

♦

John W. Baer has been appointed Chicago district sales manager, Midvale Co., Nicetown, Philadelphia. He succeeds the late John C. Glass.

♦

William A. Marsteller has been named advertising and sales promotion manager, Edward Valve & Mfg. Co. Inc., East Chicago, Ind.

♦

Walter L. Rice, special assistant to the attorney general, has resigned from the Department of Justice, to become vice president, Reynolds Metals Co., Richmond, Va.

♦

Norman F. Tisdale, Molybdenum Corp. of America, Pittsburgh, has been nominated for national trustee, American Society for Metals. Mr. Tisdale is a graduate in metallurgical engineering from Queens College, Kingston, Ont.

♦

H. E. Doughty has been appointed manager of the recently established Philadelphia branch of Jessop Steel Co., Washington, Pa. His offices are at 225 South Fifteenth street.

♦

Joseph L. Neubauer, of the New York district sales office of Carnegie-Illinois Steel Corp., has retired under the corporation's pension plan after 51 years of service, all spent in the New York office of the corporation.

♦

Albert Leon has been appointed manager, export department, Reynolds Metals Co., Richmond, Va. **Robert W. Speir Jr.** has been named assistant export manager. Both men have been members of the Reynolds organization for some time.

♦

Benjamin P. Hammond, heretofore employed in a sales capacity in the Pittsburgh office of Continental Roll & Steel Foundry Co., East Chicago, Ind., has been named eastern district sales representative, with offices at 11 Edgewood Terrace, Maplewood, N. J.

♦

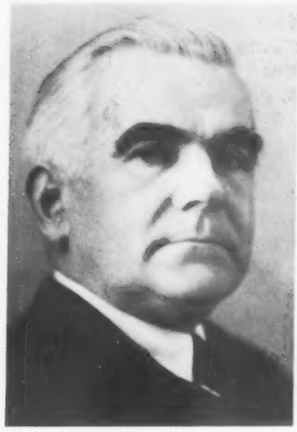
Howard F. MacMillin, president and general manager, Hydraulic Press Mfg. Co., Mount Gilead, O., was guest of honor at a testimonial dinner held recently in the presidential suite of Hotel Harding, Marion, O., by a group of 30 of his business associates.

♦

H. J. Hooks has resigned as president, Wolverine Tube Co., Detroit, due to ill health. **Charles C. Limbocker** succeeds Mr. Hooks as president and also continues as chairman of the board. Mr. Hooks had been associated with Wolverine since 1919, first as secretary-treasurer and later as president. **George**

Peter V. Martin

Thomas R. Miller



Benjamin O'Shea

Jesse J. Ricks

H. Klein has been elected a director to fill the vacancy created by resignation of Mr. Hooks.

♦

Peter V. Martin, associated with Carnegie-Illinois Steel Corp. 26 years, the past two years as assistant divisional superintendent of coke plant, blast furnaces and docks, Gary works, has been promoted to superintendent of blast furnaces, Gary works, succeeding the late W. H. Geesman. Mr. Martin is a member of the pig iron and ferroalloys committee, American Iron and Steel Institute, and also is a member of the American Foundrymen's Association, Blast Furnace and Coke Association, Chicago district, and American Institute of Mining and Metallurgical Engineers.

♦

Hollis U. Gordon and **Chester L. Glover** have established sales offices at 565 West Washington boulevard, Chicago. They are agents, respectively, for the National Broach & Machine Co., Detroit, and the Cone Automatic Machine Co. Inc., Windsor, Vt. They will be assisted by **C. E. Hartley.**

♦

L. W. Wallace, director of engineering and research, Crane Co., Chicago, was elected chairman, Industrial Research Institute, at the organization's convention in Pittsburgh, recently. He succeeds **H. Earl Hoover,** vice president, Hoover Co., Chicago. **C. G. Worthington** continues as secretary.

♦

C. W. Berquist, for 13 years superintendent of public relations, Hawthorne works, Western Electric Co., Chicago, has been named manager of the company's newly organized division of industrial and personnel relations. The new department consolidates the functions of industrial relations, public relations and personnel management. **A. P. Lancaster,** division head of public relations, has become superintendent of industrial relations, and **E. J. Skitt,** division head of personnel placement, has been named superintendent of personnel service.

♦

Thomas R. Miller, superintendent, maintenance division, Gary works, Carnegie-Illinois Steel Corp., has been appointed Chicago district industrial engineer. He succeeds **G. A. Whitehurst,** recently transferred to Pittsburgh as assistant to chief engineer. Mr. Miller had been identified with the Gary works the past seven years.

♦

D. A. Kalton and **A. W. Thomas** have been appointed assistants to the sales manager, construction equipment division, Chain Belt Co., Milwaukee. Mr. Kalton has been with Chain Belt since graduation from Marquette University in 1932 and has served in the home office sales department and as eastern district manager. Mr. Thomas, who is also a former district manager, has been associated with the company since 1927. He is a graduate of Purdue University in civil engineering.

♦

E. J. Thomas, president, Goodyear Tire & Rubber Co., Akron, O., who was born 42 years ago almost within the shadow of the Akron plants, entered the select circle of employes with 25 years' service, and received his quarter-century service pin from **P. W. Litchfield,** chairman of the board, May 25, before Goodyear employes and friends as feature of "Eddie Thomas Day" at Seiberling field, where the Goodyear baseball team played a Cleveland amateur nine.

♦

Charles T. Bailey has been appointed farm products agent in Alabama for Tennessee Coal, Iron & Railroad Co., Birmingham, Ala. Mr. Bailey, who will work under direction of **Luther Fuller,** general farm products agent, succeeds **Samuel F. Teague,** who becomes farm products marketing agent in the farm products division.

♦

Jesse J. Ricks, formerly president, Union Carbide & Carbon Corp., New York, was elected chairman of the board at a meeting of directors May 27. **Benjamin O'Shea,** heretofore vice president, was named president. **James A. Rafferty,** a vice president, was elected a director, to fill the vacancy caused by resignation of **Matthew J. Carney,** and **Robert W. White,** secretary-treasurer, was made a vice president as well.

Both the new chairman and the new president have been associated with the corporation since its formation in 1917.

Since the death of C. K. G. Billings in 1937, chairman of the board, the duties of chairman and president had been consolidated in the presidency.

♦

Joseph J. Davies has been appointed purchasing agent, Tube Reducing Corp., Newark, N. J. Mr. Davies joined Mathews Conveyer Co. in 1924, serving in the purchasing department. In 1933 he joined the general sales office of Babcock & Wilcox Tube Co. He will be located in the new office building of Tube Reducing Corp. at Wallington, N. J., in about 90 days.

♦

Albert I. Lodwick, New York aviation executive, has been elected vice president, Morton Mfg. Co., Chicago, manufacturer of railroad supplies.

♦

James H. Maguire has retired as works manager, Haynes Stellite Co., Kokomo, Ind., a unit of Union Carbide & Carbon Corp., New York. He will continue with the company in a consulting capacity.

F. T. McCurdy has become general superintendent in charge of production and operating departments of Haynes Stellite. Since 1929

he had served as superintendent. **J. R. Brown,** formerly production manager, has been made assistant superintendent, and **H. C. Fretz,** as assistant to the superintendent, will be in charge of foundries.

♦

Norman L. Deuble, formerly assistant to vice president, Copperweld Steel Co., Warren, O., has been appointed manager of sales. Mr. Deuble was associated with Republic Steel Corp., Central Alloy Co., and United Alloy Steel Co. before joining Copperweld. He is a member, American Society for Metals, and Iron and Steel Committee, Society of Automotive Engineers.

♦

J. E. De Long, president, Waukesha Motors Co., Waukesha, Wis., has been appointed assistant chief, Chicago Ordnance District.

♦

George T. Kilmon has been elected assistant secretary, and **Edward M. Martin,** assistant treasurer, B. F. Goodrich Co., Akron, O.

♦

B. D. Christian, the past year vice president and general manager, Safway Steel Scaffolds Co., Milwaukee, has been elected president.

♦

P. C. Stryker has joined the sales and service department of O. Hommel Co., Pittsburgh. He was employed in the research department of General Electric Co. from 1925 to 1928, after which he joined Hanovia Chemical & Mfg. Co. as sales representative.

♦

A. C. Middleton, assistant general auditor, Rock Island & Pacific railroad, Chicago, has been made general auditor, succeeding the late William H. Burns. **Thomas A. Graham,** chief clerk in the general auditor's office, succeeds Mr. Middleton as assistant general auditor.

♦

John M. Young has resigned as receiver of the old First National Bank & Trust Co., Fort Wayne, Ind., to become vice president, S. F. Bowser & Co. Inc., Fort Wayne, manufacturer of gasoline pumps, lubrication systems and dry cleaning equipment. Mr. Young will spend part of his time in Washington.

♦

Daniel V. Maher, 912 Marshall building, Cleveland, has been appointed factory representative in Ohio for Clover Mfg. Co., Norwalk, Conn. He will contact the industrial trade and co-operate with jobbers and supply houses in the sale of Clover coated abrasives.

♦

Petrus W. Meyeringh, since 1930 in charge of the export department, Hercules Powder Co., Wilmington, Del., has been elected a vice president and a member of the company's executive committee. **Albert E. Forster,** general manager of Naval Stores department, and **Luke H. Sperry,** chief engineer, have been elected directors.

Norman L. Deuble

♦

C. C. Oberly, president and general manager, Tokheim Oil Tank & Pump Co., Chicago, has been elected chairman for the remainder of the current term to succeed the late Charles M. Niezer. **E. S. Higginbotham,** vice president and sales manager, was elected director for the remainder of Mr. Niezer's current term. **David A. Cunningham,** assistant sales manager, has been named assistant to general manager, and **L. M. Schwartz,** manager of purchases and stores, has become assistant treasurer, in addition to his present duties.

♦

Lloyd L. Lee, formerly associated with Wilcox-Rich Division, Eaton Mfg. Co., has been elected vice president, Gordon-R-Co., Royal Oak, Mich., manufacturer of Plan-O-Mill thread and form milling machines. He will have charge of sales and engineering.

The company has purchased the manufacturing rights and business of the Plan-O-Mill Tool Corp., New York, and offices have been moved from the Marquette building, Detroit, to enlarged quarters at 625 Washington Square building, Royal Oak.

Lloyd L. Lee

♦

Charles M. Chumley, heretofore district engineer, Memphis, Tenn., has been named engineer in charge of maintenance of way, Illinois Central railroad. He succeeds **Lewis H. Bond,** who is retiring because of ill health. The road is discontinuing the positions of district engineer at Memphis and Chicago and instead there will be two assistant engineers in maintenance of way, **George M. O'Rourke** and **John E. Rogan,** with headquarters in Chicago.

♦

T. H. Gibson, secretary, Iron and Steel Control, and the British Iron and Steel Federation, has been appointed a director, British Iron & Steel Corp. Ltd., London, England. Mr. Gibson, who has been secretary of the corporation since its inception in 1936, has been succeeded by **W. G. Tubman,** personal assistant to **J. M. Duncanson,** deputy controller of steel supplies under the Ministry of Supply.

♦

George W. Borg has resigned as chairman of the board, Borg-Warner Corp., Chicago, because of the increasing burden of other duties in connection with national defense. His responsibilities as chairman have been assumed by **C. S. Davis,** president, and the position of chairman has been abolished. Mr. Borg retains his position on the board of directors of Borg-Warner, his presidency of Borg & Beck division, and also as a director of Pump Engineering Service Corp.

♦

William W. Coffeen has been appointed research associate for the Porcelain Enamel Institute at the National Bureau of Standards, effective June 16. Until recently Mr. Coffeen had been instructor in ceramic engineering, Georgia School of Technology, Atlanta, Ga.

♦

A. W. Parker is retiring from active service with Worthington Pump & Machinery Corp., Harrison, N. J., after 54 years' continuous service. In recent years he has been engaged in a publicity capacity.

♦

Fred W. Muller has been appointed manager of Armstrong Cork Co.'s High Temperature Insulation Department, Lancaster, Pa., succeeding **Fred M. Ritts,** who has been made assistant manager of the newly organized Munitions Division. Associated with Armstrong since 1937, Mr. Muller formerly was in the Detroit office.

DIED:

■ **Edwin A. Bateman, 62, since 1934** junior partner, Bauer, Wilson & Bateman, Chicago, pig iron and coke merchants, in that city, June 4. Prior to 1934 he was associated with Pickands, Mather & Co., Chicago, for almost 30 years in pig iron and coke sales.

♦

Warren G. Jones, 50, president, W. A. Jones Foundry & Machine Co., Chicago, at his home in River Forest, Ill., June 5. He had been associated with the foundry company since 1910, and president since 1925.

♦

J. C. Kilroy, 57, secretary-treasurer, Lustro Coated Sheets Co., Pittsburgh, in Pittsburgh, June 4. He was associated with the steel industry many years, and was a former official of Follansbee Bros. Co.

♦

George L. Bennett, 69, in Queens, N. Y., June 3. Mr. Bennett retired as president, G. L. Bennett Machinery Co., New York, in 1932.

♦

Samuel K. Dennis, 82, an inventor and superintendent of experiments, International Harvester Co., Chicago, until his retirement 15 years ago, in that city, June 2.

♦

Robert M. Peterson, 52, assistant advertising manager, American Steel & Wire Co., Cleveland, May 30, in Scottdale, Pa.

♦

Edgar P. Fidler, owner, Penn Iron Works, Reading, Pa., recently, in that city.

♦

Harry S. Hart, 70, since 1906 president, Rodger Ballast Car Co., Chicago, in Barrington, Ill., May 27.

♦

John F. Roche Jr., 35, vice president, Binks Mfg. Co., Chicago, May 28, in that city.

♦

Homer F. Sheets, 44, Chicago district sales manager, Victor Safe & Equipment Co., North Tonawanda, N. Y., May 28, in Chicago.

♦

Lawrence G. Olson, president, Olson Mfg. Co., Boise, Idaho, April 19, in that city.

♦

Irwin A. McIntyre, 55, one of the founders of Milwaukee Steel Foundry Co., Milwaukee, May 22, in that city. He was purchasing agent and assistant to general manager, International Harvester Co. for some time, and served as director and secretary of the Milwaukee company until 1932.

♦

Thomas Alfred Finn, 49, vice president, Cap, Screw & Nut Co. Inc., New York, in New York, May 28. Before joining the New York company he was eastern representative of Worth Steel Co., Claymont, Del.

♦

Arthur W. Berresford, 68, electrical engineer, who was a former vice president and general manager, Cutler-Hammer Inc., Milwaukee, and retired managing director, National Electrical Manufacturers' Association, May 30, in New York.

Westinghouse Farms $10,000,000 in Contracts

■ To accelerate national defense production, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has subcontracted $10,000,000 worth of emergency contracts to more than 100 companies.

Westinghouse now has orders exceeding $190,000,000 on its books, and is farming out orders to obtain earlier delivery as well as to avoid plant expansions which would become burdensome when the emergency has passed.

Largest portion of the company's defense output is propulsion equipment for naval vessels and special radio equipment for military purposes. Other leading products include generators, switchgears, motors, transformers and lighting equipment, including aviation and seadrome lights.

Tool Engineers Name Committee Chairmen

■ To head national activities of the American Society of Tool Engineers for 1941-42, committee chairmen have been appointed by Frank W. Curtis, ASTE president, and chief engineer, milling machines, Van Norman Machine Tool Co., Springfield, Mass. Committees, chairmen and their company affiliations follow:

Emergency defense training, O. W. Winter, Columbus McKinnon Chain Co., Tonawanda, N. Y.

Historical, O. B. Jones, Detroit College of Applied Science.

Constitution and by-laws, R. M. Lippard, Heald Machine Co., Worcester, Mass.

Membership, E. W. Dickett, Sundstrand Machine Tool Co., Rockford, Ill.

Industrial relations, E. A. Rutzen, Evinrude Motor Division of Outboard Marine & Mfg. Co., Milwaukee.

Standards, E. W. Ernest, General Electric Co., Schenectady, N. Y.

New chapters, Roy T. Bramson, Bramson Publishing Co., Detroit.

Editorial, I. F. Holland, Pratt & Whitney Co., Hartford, Conn.

Publicity, C. B. Cole, Tool Equipment Sales Co., Chicago.

Educational, H. D. Hall, Herbert D. Hall Co., Newark, N. J.

Build 52 All-Steel Houses in South

■ Fifty-two homes for employes, plus dormitories, a hotel, cafeteria, airport hangar, radio station, office building and other buildings, all of arc-welded steel construction, have been built by R. G. LeTourneau Inc., constructors of earth-moving machinery, at its Toccoa, Ga., plant.

Foundation and floors of the houses are concrete; I-beams are embedded in the concrete to provide for welded construction. Wall panels are 12-gage mild steel, and each wall is of double construction with insulating material blown between walls.

Only wood used in the houses is in the doors. Finished houses, varying in size from five to nine rooms, range in cost from $2500 to $3000.

Windows of *WASHINGTON*

By L. M. LAMM
Washington Editor, STEEL

War department adds $17,000,000 to revolving fund for purchasing machine tools required for manufacture of new ordnance items . . . OPM reports 73.4 per cent of defense plant expansion costs assumed by the government . . . Bill for seizing defense property backed by army officials . . . Budd indicates steel for freight cars will be made available

WASHINGTON

■ WAR DEPARTMENT has added another $17,000,000 to its revolving fund for purchase of machine tools, it was announced last Friday. This money will be used to purchase tools for manufacturing certain new ordnance items for which contracts have not been let. By anticipating machine tool demands, the department expects to eliminate bottlenecks.

In November, 1940, $15,000,000 was made available for this purpose. In January, $2,000,000 was authorized for purchasing machine tools that had been manufactured for export but for which export licenses had been denied. In taking over these tools the department paid the original purchaser for them, and in turn sold them to defense contractors. Many tools that were intended for foreign governments now are in use in this country's rearmament program.

Under the revolving fund system the department places the orders, then later releases the tools to industries requiring them. In this manner several months' lag is eliminated.

Iron, Steel Defense Commitments Total $280,165,000

More than 1700 projects and nearly $3,000,000,000 in commitments are involved in defense plant expansion, construction and equipment contracted for in the first year of defense.

Of the costs, 73.4 per cent was assumed by the government, OPM reported in a tabulation last week. The totals do not include private investments in plants established before the defense program or built since with government assistance by accelerated tax amortization.

Commitments for iron and steel production totaled $280,165,000, of which $135,994,000 came from the government and $144,171,000 from private companies.

Government commitments for aircraft, engines, parts and accessories are $490,821,000, which combined with the private outlay of $95,444,000 makes a total of $586,265,000.

For nonferrous metals and products government totals are $67,937,000, private commitments are $145,243,000 and total is $213,180,000.

Government outlay is $44,220,000 for machinery, except electrical. Private commitments are $101,608,000, bringing the total in this classification to $145,828,000.

Government Finances More Expansions for Rearmament

Defense Plant Corp. will provide $353,723 to build and equip a plant at Marion, Ind., for Anaconda Wire & Cable Co. to manufacture assault wire for the Signal Corps, it was announced last week. Under a $293,884 agreement, Okonite Co., Passaic, N. J., which also has an assault wire contract, will be supplied with machines and tools.

Lapointe Machine Tool Co., Hudson, Mass., will receive $200,000 worth of broaching machinery and equipment, it was announced.

A plant will be constructed and equipped at Hamden, Conn. for the High Standard Mfg. Co. Inc., New Haven, Conn., at cost of $4,300,000. The company will make machine guns.

Defense Plant Corp. has increased by $415,969 a lease agreement covering the Louisville plant of the Reynolds Metals Co. About $349,133 of the extra allotment will be spent for equipment. The original commitment was $2,504,611.

DPC also will build and equip a $17,500,000 bomber plant at Wichita, Kans., for Boeing Airplane Co., and has authorized $272,500 for machinery and equipment for Boeing's training plane plant near Wichita.

Moore Dry Dock Co., Oakland, Calif., constructing navy vessels, has been awarded an increase of $624,800 in its present agreement. Of this additional amount $497,431 is earmarked for machinery.

St. Lawrence Hearings To Begin June 17; Opposition Strong

Hearing on legislation to authorize construction of the St. Lawrence seaway and power project will be held before the house rivers and harbor committee beginning June 17. Bill authorizing the construction as a defense measure had been introduced earlier in the week after the President sent a message strongly recommending it.

Declaring the nation's emergency may last more than four years, the President asserted 2,200,000 horsepower of low-cost electric current for joint defense of United States and Canada would be made available. Great Lakes shipyards also could be used then, he pointed out, for a longer-term naval program. Coastal yards would be freed for construction of additional merchant vessels. Opponents repeated that the President is using the "emergency" as means for putting over a "pet project" which could not stand on its merits.

Violent opposition faces the bill in both house and senate.

Price Schedule for Secondary Aluminum, Scrap Amended

Office of Price Administration and Civilian Supply last week re-

5 Reasons

WHY YOU SHOULD ADOPT

The Speed Nut System (PATENTED)

SAVES MATERIAL	MAKES 50% REDUCTION IN NUMBER OF ASSEMBLY PARTS
AVOIDS OVERWEIGHT	REDUCES TOTAL WEIGHT OF FASTENINGS OVER 60%
HOLDS TIGHT LONGER	RESISTS VIBRATION LOOSENING FROM 3 TO 5 TIMES LONGER (SEE AIRCRAFT TEST)
ADDS SPEED	CUTS ASSEMBLY TIME 50 TO 75%
SAVES MONEY	REDUCES AVERAGE NET ASSEMBLY COSTS 50%

SPEED NUTS and SPEED CLIPS are manufactured for most standard sizes of bolts, screws, rivets and studs. Made for metal, wood, ceramic or plastic applications. Simply send us your assembly details and we will furnish samples and engineering data promptly.

TINNERMAN PRODUCTS, INC. 2039 FULTON ROAD CLEVELAND, OHIO

Manufacturers of Patented SPEED NUTS

IN CANADA: Wallace Barnes Co., Ltd., Hamilton, Ontario. IN ENGLAND: Simmonds Aerocessories, Ltd., London. IN FRANCE: Aerocessoires Simmonds, S. A., Paris.

moved special secondary aluminum alloys from the maximum price schedule covering secondary ingot with the statement that dealers are expected to hold quotations in line with standard grade quotations despite wider discretion given them.

Principal changes in Price Schedule No. 2 (STEEL, May 12, p. 34), designed to simplify administration of aluminum scrap and secondary ingots, include:

1—Special secondary aluminum alloys have been removed from that part of the schedule relating to secondary aluminum ingots. The types of aluminum alloy ingots now covered by the schedule include all silicon, piston and the No. 12 alloys. However, the usual differentials based upon market prices of the ingredients and expenses of manufacturing are to be observed.

2—Price regulation has also been removed from aluminum scrap of designated grades produced by the aircraft industry, segregated as to alloy, and returned to the supplier of the original material for reconversion into similar material in accordance with instructions of the director of priorities.

3—Quantity differentials for aluminum scrap have been removed but such differentials continue on secondary aluminum ingots sold in less than 30,000-pound lots.

4—A special note has been added to Appendix A removing from the schedule aluminum foil and light gage sheet which does not exceed 0.006-inch in thickness.

Removal of special aluminum alloys from the schedule of maximum prices gives the trade wider discretion in establishing fair differentials for such ingots, Mr. Henderson explained. However, producers and dealers are expected to keep prices of such products in line with maximum prices established for the more standardized grades, he stated. It is expected that customary differentials will be maintained. If this is not done voluntarily, such differentials will have to be established by regulation, Mr. Henderson added.

Vanderlip Appointed to Eastern Regional Housing Administration

Frank A. Vanderlip Jr. has been appointed regional housing co-ordinator in charge of New York, New Jersey, Pennsylvania, Delaware, Maryland, District of Columbia, Virgin Islands, Cuba, Puerto Rico and the Canal Zone.

W. Homer Hartz, president, Morden Frog & Crossing Works, Chicago, and chairman of the board and immediate past president, Illinois Manufacturers' Association, has been named co-ordinator for the Priorities Division, OPM. He also is co-ordinator of the Defense Contract Service in the Seventh Federal Reserve District, Chicago.

A. R. Glancy has resigned as head of OPM's ordnance production unit to go to London as an assistant to W. A. Harriman, Lend-Lease material expediter. Mr. Glancy, who was president of A. R. Glancy Inc., Detroit, left last week on the Transatlantic Clipper.

Robert E. Sessions has been appointed assistant director of the Price Division, Office of Price Administration and Civilian Supply. He formerly was assistant to the general manager, Tennessee Valley Authority. Karl Borders, formerly executive assistant in the National Youth Administration, has been named price executive in the rent section of the Price Division. Quinn Shaughnessy was appointed price executive for the fuel section. He is on leave from the Securities and Exchange Commission.

War Department Backs Bill For Seizing Defense Property

Sweeping new powers which would authorize President Roosevelt to requisition private property of any kind which might prove necessary for national defense were asked of Congress last week by the War Department.

The War Department's bill is broad enough to cover all privately owned airplanes, automobiles, trucks, buildings of all kinds, including warehouses, mills, manufacturing plants, shipyards, railroads and other properties.

Proposed legislation provides the President could set a "fair and just" price on the seized property. If this were not satisfactory to the owner, he would be paid 75 per cent of the President's appraisal and could sue for the difference.

The President commented the proposed powers would arm the government with a last resort weapon to deal with labor disputes in defense industries. If the goods are not being delivered due to a strike, the government could step in, take over the property, and tell the strikers to go back to work.

Oil Industry Now Reports To Ickes, the "Co-ordinator"

Prohibition of Sunday sales of gasoline for automobiles, a 5-degree reduction in temperatures of oil-heated houses and restrictions on the use of kerosene were suggested last week by the oil industry as a means of combating the future oil shortage on the East coast, to be caused by lack of oil tankers. Fifty such tankers have been transferred to the British war effort in the past month.

The industry's report was submitted to Secretary of Interior Ickes, recently named oil co-ordinator by President Roosevelt.

California oil producers were called to a conference June 7 by the OPACS to explain recent increases in California crude oil prices. These were accompanied by an increase of about one cent a gallon for gasoline.

Suspends Publication of Destination of Exports

Detailed statistics on destination of exports will not be published in the future, the Department of Commerce announced last week. Suspension was ordered in the interests of national and hemisphere defense.

Character of this country's foreign trade, the department points out, has been completely altered in the past year and a half, through war, foreign exchange restrictions, import quotas, scarcity of ocean tonnage. "Our export trade has been channelized to such an extent that partial or fragmentary figures with respect to country of destination would prove of little help in the promotion of what remains of our commercial foreign trade, and yet could be immensely useful to forces whose activities are inimical to the interests of this country."

Steel for Freight Cars Will Be Made Available

Steel sufficient for a greatly expanded freight car building program will be made available in 1942, Ralph Budd, defense transportation commissioner, has indicated. Commenting on delays in car construction because of insufficient supplies, Mr. Budd said some builders are discouraged over the prospect of obtaining enough steel for a bigger program next year.

To the minimum freight car ownership which Mr. Budd suggested last summer has been added a goal of 120,000 cars before the fall of 9412, and 150,000 cars for 1943.

OPACS Adds Transportation Unit To Stabilize Charges

Creation of a transportation unit in the Office of Price Administration and Civilian Supply was announced last week by Leon Henderson, administrator. Dr. Lloyd Wilson, University of Pennsylvania economist, will head the unit. He will be assisted by John H. Eisenhart, attorney, and John Simpson, rate expert, who have been connected with Maritime and Interstate Commerce Commissions.

The unit will continue the work undertaken by OPACS to avert unjustified increases in transportation costs.

France, Losing Much of Steel Output To Nazis, Experiencing Acute Shortage

By LEON JAUDOIN
French Correspondent, STEEL

Somewhere in France, by Courier to United States

■ ACTIVITY in the iron and steel industry in France is at a low ebb. Germany takes a considerable portion of the production of mills in the northern and eastern districts. These works are permitted to supply small tonnages to occupied France, but the allotments are too small to cover normal requirements of French industries.

In an effort to produce greater tonnages, all open hearths, even those which are obsolete, have been rehabilitated and placed in service.

Iron ore and coal are scarce. Coal mining in the St. Etienne district is hampered by a shortage of workers. The Polish and Czechoslovak miners who have worked in the mines since 1919 have been returned to their native countries. Their replacement is difficult.

Pinch in steel supplies is further aggravated by transportation difficulties. There are too few freight cars. Ice in the canals during the past winter halted movement by barges.

The situation has become acute. Manufacturers are vainly striving to obtain raw materials. Pieces of plates or merchant bars which in the past were considered as scrap now are eagerly sought and considered first class goods by French manufacturers.

Efforts have been made by the government to grant priorities for the essential needs of the country and to ration the remainder among consumers. For a time consumers were permitted 25 per cent of the amount of pig iron used in 1938 and 35 per cent of the steel used in that year.

Use of iron or steel for making gates, doors, balconies, fences, light buildings such as garages and service stations, steel houses, furniture and similar items is forbidden. Stainless steel is prohibited for ornamenting buildings, and for making ash trays or kitchen utensils.

Plates, sheets and tin plate cannot be used for making cigaret or cigar boxes, or containers for biscuits, sugar or candies, or for window shades and some kinds of toys.

Unemployment continues a troublesome problem.

Iron and steel prices recently have advanced about 35 per cent and now are quoted as follows, French francs per metric ton:

Standard rails	2591	Black sheets	3125
Merchant bars	2084	Plates, 5 mm	2656
Structural shapes	2025	Hoops and bands	2332

(The French franc last week was quoted at $2.31 per 100).

Electro Metallurgical Buys Bonneville Power

■ Electro Metallurgical Co., subsidiary of Union Carbide & Carbon Corp., New York, has contracted to buy 13,000 kilowatts of Bonneville power to produce ferroalloys and alloying metals. Company's contract provides it will take 6500 kilowatts annually for 20 years and 6500 kilowatts for two years. Deliveries will start in February, 1942.

31-Year-Old Silver Spade Breaks Ground for Armco's New Texas Plant

■ A silver spade which has been used in breaking ground for all important additions to American Rolling Mill Co. plants since 1910 was used by George M. Verity, Armco chairman, May 27, to turn the first earth for the company's new $17,000,000 steel plant on the Houston ship canal, Texas.

Employing a process for making steel exclusively from scrap iron developed in 1918 by the Sheffield Steel Corp., Armco subsidiary and operator of the new plant, the three 100-ton open hearth furnaces will produce 200,000 tons of steel annually. Initial equipment will include billet mills and finishing mills. Finishing departments will have a structural and tie plate mill, reinforcing and rod mills, a wire plant, and hot sheet and plate mills.

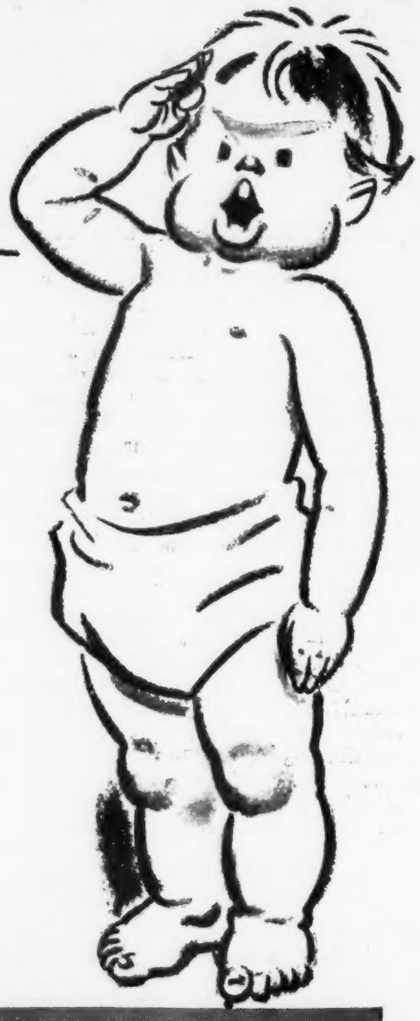
Plant will have about 1500 men on its payroll estimated at $2,500,000 annually. It is to be built on a 600-acre wooded site, allowing adequate room for expansion.

Advantages of the plant include the elimination of long hauls of scrap iron and steel to eastern and northern mills and the back-haul of finished products, according to company officials. It is designed to produce the products Texas and the Southwest needs from the raw materials—principally scrap—available in the area. (See also STEEL, June 2, page 26).

Shown in photo are Mr. Verity, with spade; Charles R. Hook, Armco president, second from left; R. L. Gray, president, Sheffield Steel Corp., at left of Mr. Verity; and Calvin Verity, executive vice president of Armco, at extreme right.

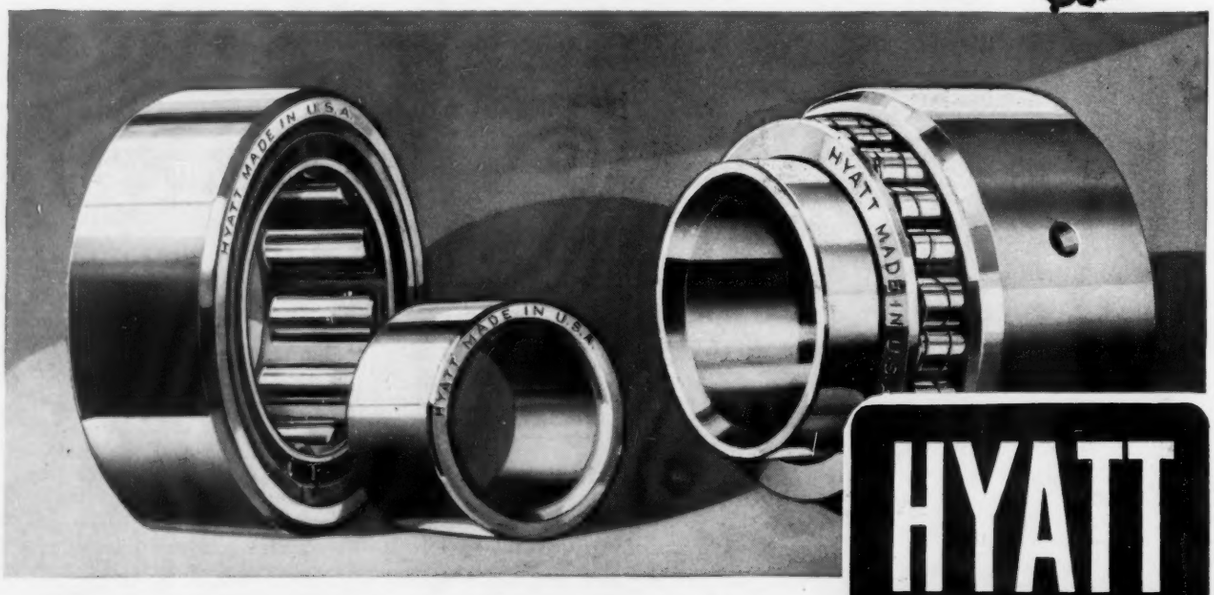
ORDER OF THE DAY

KEEP THEM YOUNG WITH HYATTS!



UP IN THE FRONT LINE of machine design . . . guarding gears, wheels, and shafts from the onslaught of friction and wear . . . millions of Hyatt Roller Bearings carry on their unremitting war against inefficiency.

Serving and saving, year after year, Hyatts carry on through long hours, adverse weather conditions, extreme speeds and shock loads. They have the staying power to keep equipment going, to prolong machine life. Make Hyatt Equipped your "order of the day." Hyatt Bearings Division, General Motors Sales Corporation, Harrison, New Jersey; Chicago, Detroit, Pittsburgh, San Francisco.



HYATT

ROLLER BEARINGS

QUIET

Mirrors of *MOTORDOM*

By A. H. ALLEN
Detroit Editor, STEEL

Substitutions pose variety of economic problems in motorcar usage. Urge allocation of specified maximum quantities of critical metals rather than restrictions on specific applications . . . Quality of new cars will not suffer, but higher costs appear unavoidable . . . Secondary aluminum industry pleads with OPACS for licensing of all scrap

DETROIT

■ PROBING for substitute materials occupies the full attention of automotive engineering departments these days and their task is anything but easy. As fast as they believe they have one situation cleared up, a new order comes from Washington which upsets all their carefully drawn plans and they have to start from scratch again. Witness the plight of the bus builder who, after weeks of research, calculation and testing, finally worked out a design which called for steel sheets to substitute for aluminum alloy. Now all steel is on virtual priority and he may find as much difficulty getting the required grade of steel sheet as he does aluminum!

In this connection, the chief metals expert of one of the leading auto companies draws a careful distinction between the "possibilities" of substitutions and the "probabilities." Thus a lead-antimony alloy can be used in place of zinc, molybdenum for nickel or tungsten, cast iron for aluminum, but there are factors even beyond available supply which must be examined to determine the probability of such changes. Most of these factors are economic in nature. First is the influence on resulting quality of product; next the effect on cost, the requirements of tooling, man-hours of labor on both tools and production, potentialities of strictly design changes, and finally the benefits accruing from substitute methods of manufacture.

Take a look at these various items. As far as available supply of metals is concerned, no one can make any reliable predictions. There is supposed to be 52,000 tons of zinc available this month for nondefense purposes, yet die casters cannot get metal, even though this tonnage is not too far below the 57,000 tons available in June, 1940. Some of the motor companies have been approached with propositions for off-the-record purchases of zinc "at a price," but naturally they frown on any such shady deals—at least they say they do.

Some Shortages Artificial

So the motor companies feel that some of the present shortages are real, some of them artificial. Effects of shortages can be created easily by duplications in purchasing requirements, allocations of metals for work as yet only on paper and the purchasing of stocks for speculation.

If, as now seems certain, metals are going to be allotted to various industries, the question of fairness arises. One authoritative opinion is to the effect that allocators should take due cognizance of savings already effected in various metals by industry. That is, a company which has now worked out metal savings should be allowed to participate in such savings, thereby giving greater incentive to institute such conservation.

Furthermore, the suggestion is made that, rather than having someone at Washington decide for what purpose a company can use a specific metal, it might be far better to allot a specified maximum quantity to be used at the discretion of the manufacturer. One user, for example, may build a heavy-duty motor which would be benefited greatly by the use of a small amount of nickel for hot strength, while another might gain much in tool and changeover costs by being allowed to use a small amount of nickel for plating. It serves no useful purpose to issue arbitrary decrees saying in effect, "No more nickel for this" and "no more nickel for that."

Unanimity of opinion exists among motor companies that substitutes, no matter what they be, will not affect quality of the product to any great extent. Some slight concessions will have to be made on this score, but 1942 models (and late 1941s, too) are not going to suffer too much in comparison with their predecessors. In fact, one current model, with about 50 per cent of the chromium plating removed from the front end, to many looks 50 per cent better than the former styling.

If it is agreed that substitutes can be made with no deterioration in quality, the obvious question is: Why was it not done earlier? The answer is purely and simply cost. Here is where the main impact of substitutes will be felt. How much? No one can say for sure, as yet, but a guess is $25 to $50 in the average lowest-priced high-volume car. Much will depend on how far it becomes necessary to go on substitutes and how far production curtailment must be carried. The more the substitutes and the lower the volume, the higher costs will mount.

Consider carburetors, now of zinc die castings, but being tooled for cast iron because of zinc shortages. Actual metal cost is less in cast iron, but the machining, drilling, tapping and other finishing operations neces-

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sary on cast iron are treble or quadruple those incident to finishing the die casting. A specific example of this situation is a speedometer part, produced in a die casting at a piece price of 19 cents. Changing to cast iron involves a machining cost of around 45 cents, not including the cost of the rough casting. Many such substitutions will require more pounds of tool materials to handle the increased amount of metal to be cut away, and some of these tools are among the most difficult to obtain. A glance at the order books of tool steel companies will prove this beyond doubt. The Detroit office of one company, for instance, with an annual volume of business over the past few years of $100,000, so far this year has booked orders in excess of $1,100,000.

Carrying the reasoning a step further, it is perfectly obvious that with necessary increases in tool requirements and machining time a comparable increase in both nonproductive and productive manhours of labor must follow. And complete retooling for substitute materials demands man-hours where they least can be spared.

Design engineers are rendering yeoman service on this matter of automotive materials. The illustration is cited of certain valve materials not suitable for a present design of valve which can be pressed into service by increasing the angle under the head of the valve and adding 0.010 or 0.015-inch of stock on the top face.

Need for Firmer Hand Seen

Engineers are not disposed to become crochety over their irksome tasks of developing substitutes. They know the best interests of the defense program are being served. But if they could express a few fervent wishes Washington-ward they would be these: That rulings on material allocations be based on —(1) the will to do the greatest good for defense, labor and all industry; (2) decisions to be made by those with sufficient knowledge of the problems they are tackling; (3) sufficient authority to be vested in those making the decisions to enforce them; and (4) such authority to be accompanied with the required intestinal fortitude to the end that a decision, once reached, will be adhered to.

Add up all these observations and you have a rather gloomy outlook for automobiles. Higher costs, some slight relapse in quality perhaps, recurring bottlenecks in materials resulting from government mandates, production curtailment probably in excess of 30 per cent and possibly up to 50 per cent. In fact, some motor company executives admit waking from horrible dreams in which they made no new automobiles at all!

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1939	1940	1941
Jan.	356,962	449,492	524,126
Feb.	317,520	422,225	509,233
March	389,499	440,232	533,912
April	354,266	452,433	489,841
4 mos.	1,418,247	1,764,382	2,057,112
May	313,248	412,492	.....
June	324,253	362,566	.....
July	218,600	246,171	.....
Aug.	103,343	89,866	.....
Sept.	192,679	284,583	.....
Oct.	324,689	514,374	.....
Nov.	368,541	510,973	.....
Dec.	469,118	506,931	.....
Year	3,732,718	4,692,338	.....

Estimated by Ward's Reports

Week ended:	1941	1940†
May 10	132,630	98,480
May 17	127,255	99,030
May 24	133,560	99,810
May 31	106,395	61,255
June 7	133,645	95,560

†Comparable week.

Scrap for Smelters Dries Up; Some Foundries Covered

The seeming impasse in the aluminum scrap market has some interesting angles. Aluminum smelters throughout the country are taking in virtually no scrap, with the result that they have had to release hundreds of men and to confine their activity to "toll" smelting of scrap owned by private companies. Aluminum scrap dealers likewise have no aluminum scrap, with the result they are unable to move material to smelters. Secondary aluminum companies (smelters) hence are 60-90 days behind on contracted deliveries, some of which are for defense equipment.

On the other hand a number of aluminum foundries, captive and otherwise, have been able to pick up, and even resell, aluminum scrap from the 25,000 peddlers handling this material. So the melters want the OPACS to license all aluminum supplies to compel them to clear through smelters; the aluminum foundries are not too keen about such an arrangement since it would mean they could no longer buy from peddlers but would have to obtain all materials from smelters. The OPACS appears right in the middle of this situation and despite the reported legal approval of a licensing plan has not yet released it.

Last week price regulations were removed from special aluminum alloys which heretofore had been covered by controls on secondary aluminum. Hoped-for result was the resumption of a more normal flow of scrap. Motor companies are willing to pay most any price for aluminum to avoid having to change piston and engine designs, and the relaxation of price control may improve their position.

Twenty-Six Million Get Living from Auto Industry

One out of every seven working people in this country is employed in motor transport, according to a study made by the National Automobile Dealers Association. This force aggregates 6,500,000 persons, spread throughout the manufacturing of motor vehicles, parts and tires, petroleum refining, sales and servicing, federal and state road departments, truck and bus drivers and raw material suppliers. If each supported an average family of four, a total of 26,000,000 individuals would be provided with a living directly from the motor industry. Employed directly in the manufacture of motor vehicles, bodies and parts in 1940 were 447,000.

Aircraft division of Hudson Motor Car Co. has received a new contract for construction of rear fuselage sections for the Martin B-26 bomber, to be shipped to Omaha, Nebr., for final assembly. This is the same bomber for which Chrysler Corp. is now preparing to supply certain fuselage and wing subassemblies.

Army Wants More Trucks

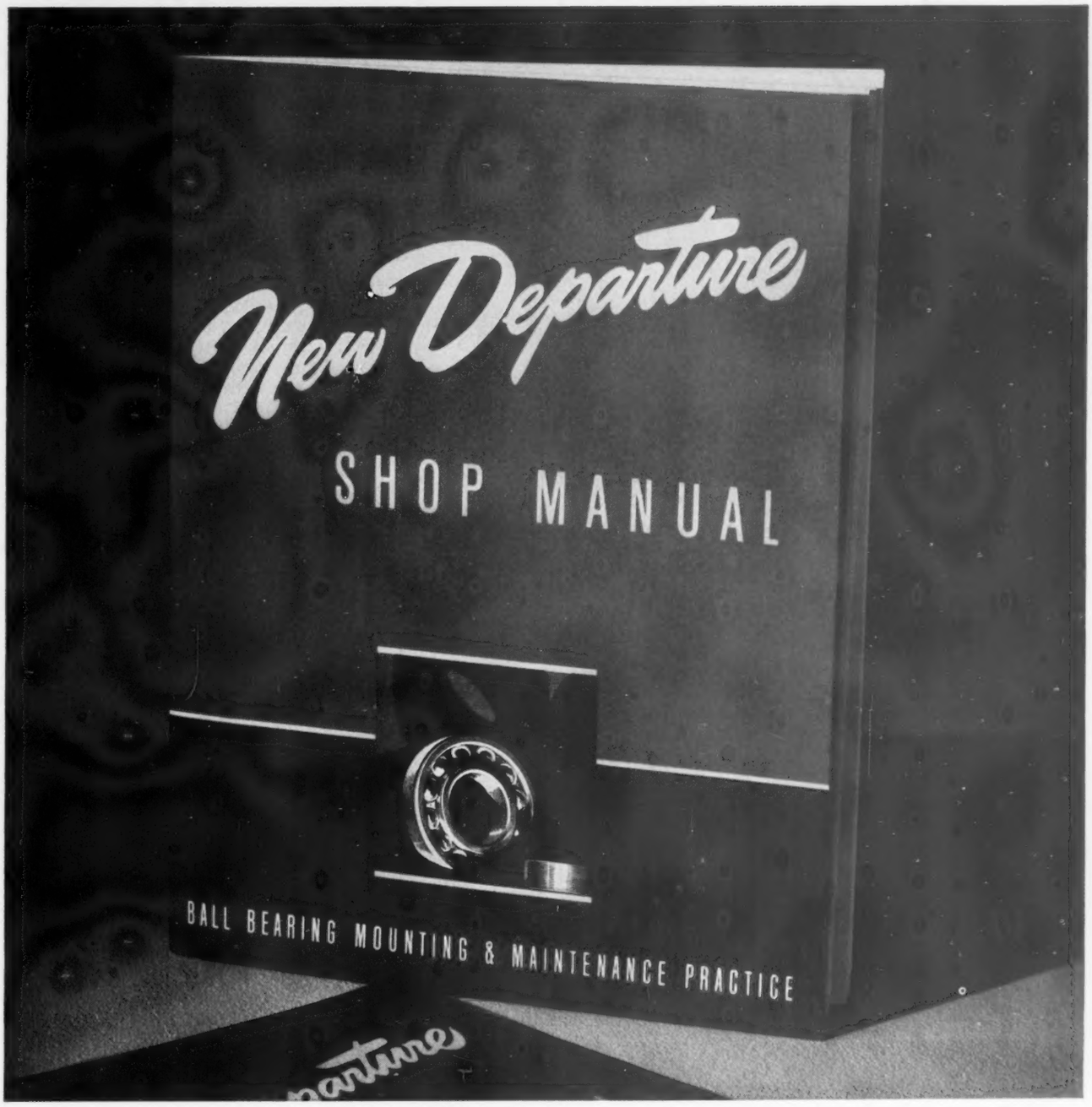
Chrysler has received a new order for 12,000 more Dodge trucks for the army, bringing to 73,000 the number of army trucks ordered in the last 12 months. At present, 42,295 have been delivered, with the balance coming off lines at a rate of 250 per day. New order, involving better than $11,000,000, is for four-wheel drive ½-ton trucks of seven different types.

Yellow Truck & Coach Division of General Motors has received a $41,000,000 order for military trucks, delayed by the war department since early in March.

Retail sales of new passenger cars and trucks in the United States during April totaled 557,192 units—483,273 passenger cars and 73,919 commercial vehicles.

Employe Disabilities Summarized

Dr. C. D. Selby, medical consultant for General Motors, in a recent address gave some interesting figures on employe disabilities during 1940. Of 187,000 hourly rated GM employes, 22,521 were disabled for periods in excess of seven days. Occupational causes applied to 1395 cases, nonoccupational to 18,935. Greatest source of lost time in 1940 was appendicitis, 2197 cases of which caused 101,174 days' time lost. Influenza took 43,183 days and tonsillar infections 38,094 days.



Still At Your Service . . .

While New Departure's vast productive facilities are giving defense projects right of way, New Departure's technical staff has not forgotten its duty to its regular customers.

In fact, both old and new users of New Departure Ball Bearings will find extremely helpful this latest addition to the New Departure Engineering Library—the Shop Manual.

The New Departure Shop Manual should be read by every man responsible for the correct installation of ball bearings for maximum service and long life. Send for your copy and tell us how many additional copies would be required to supply your interested personnel. New Departure, Bristol, Connecticut.

NEW DEPARTURE BALL BEARINGS

3010

OPM To Give Consumer an Order for Steel "If the Case Seems Justified"

■ A GENERAL Steel Preference delivery order designed to give defense needs and essential civilian needs first call on all forms of steel, was issued last week by E. R. Stettinius Jr., director of priorities for the OPM.

The order constitutes a further step in the Priorities Division's program, which began early this year, to facilitate delivery of steel products promptly for all defense requirements. The new action also has been adopted by the Office of Price Administration and Civilian Supply as the basis for its program for the equitable allocation of steel among competing civilian needs, after satisfaction of military defense requirements.

Mr. Stettinius states in the order that overall demand for steel, including defense and civilian demand, is greater than the apparent capacity to make deliveries of certain types of steel and steel products promptly.

It is essential, therefore, he says, to make sure that orders for defense operations and important nondefense projects are neither rejected by steel suppliers nor unreasonably deferred in delivery.

Any customer who by his own efforts has been unable to obtain satisfactory placing or delivery of his orders for steel, can make a sworn statement of his difficulties to the Priorities Division, Office of Production Management.

If the case seems justified, the division will then require the supplier involved to make a sworn statement explaining why the order was rejected or deferred. Upon the basis of this information, the division will take whatever priority action is necessary to fill defense and essential nondefense needs for steel promptly.

Text of Steel Preference Order

To all producers of pig iron, ferroalloys, steel ingots and castings, and all carbon and alloy steel products, and to their customers:

WHEREAS, it is found that the current demand for deliveries of these products under defense orders, as hereinbefore defined, and for civilian purposes, is greater than the ability of producers to deliver the same in the required amounts upon delivery dates scheduled; and

WHEREAS, deliveries of these products are being delayed and orders therefor rejected due to the aforesaid causes; and

WHEREAS, it is necessary to assure deliveries under defense orders and other orders for necessary nondefense purposes when scheduled and to assure that such orders be not rejected; and

WHEREAS, the purpose of this order may be fulfilled by authority conferred by the several acts of Congress, executive orders and regulations hereinafter cited:

NOW, THEREFORE, IT IS HEREBY ORDERED:

General Delivery Order:

(a) For the purposes of this order:

(1) "Defense orders" means all contracts or orders for delivery of pig iron, ferroalloys, steel ingots and castings, and all carbon and alloy steel products which are to enter directly or indirectly into the manufacture of any material

(i) for the Army or the Navy of the United States, or

(ii) for the defense of Great Britain, or

(iii) for the government of any other country whose defense the President shall have deemed to be vital to the defense of the United States under "An Act to Promote the defense of the United States" (Public No. 11, 77th Congress, First session, approved March 11, 1941), or

(iv) for the account of the following agencies of the United States government: The Coast Guard, Maritime Commission, Coast and Geodetic Survey, Panama Canal, National Advisory Committee on Aeronautics, and the Civil Aeronautics Administration.

(b) All producers of pig iron, ferroalloys, steel ingots and castings, and all carbon and alloy steel products shall fulfill present and future defense orders, giving preference to the same, whenever and to the extent necessary to assure deliveries under such orders in accordance with the delivery schedules provided therein.

(c) Deliveries of the aforesaid products by any producer thereof shall hereafter be made in accordance with any written order, supplementary order, or instruction which may hereafter be issued, if and when the same are hereafter issued.

(d) Any customer of a producer of the aforesaid products whose deliveries thereof under any order have been unreasonably deferred by a producer, and any prospective customer of a producer of the aforesaid products whose order therefor has been rejected by such producer may file with the Division of Priorities, Office of Production Management, Washington, Report Form PD-32 (Exhibit A attached hereto) duly executed and sworn to by him in the manner herein provided, setting forth the facts called for in said Report Form PD-32 in connection with such deferral or rejection.

Records To Be Inspected

Upon receipt of such Report Form PD-32, duly executed and sworn, from a customer, Order Form PD-32a (Exhibit B attached hereto) will be issued to the producer or producers indicated by such customer if the facts set forth by such customer justify such issuance, and thereupon within five days of the issuance of such Order Form PD-32a, the producer or producers to whom the same has been issued shall submit a sworn statement to the Division of Priorities, setting forth in detail the cause or causes for the deferral of the delivery or deliveries, or the rejection of the order or orders specified.

Thereafter, such action will be taken and such order or orders issued as may be fitting and appropriate under the circumstances disclosed by the customer and the producer or producers in question.

Any producer or producers of the aforesaid products to whom an Order Form PD-32a is issued, shall submit to inspection any and all records, documents and data in connection with the delivery or deliveries, order or orders referred to in said Order Form PD-32a by a representative of the Division of Priorities.

(e) The General Preference Order No. M-5 (Part 926) for the conservation and distribution of nickel bearing steel, the General Preference Order No. M-3 (Part 923) to direct the distribution of ferrotungsten, tungsten powder and tungsten compound, and the General Metals Order No. 1 (Part 928) to restrict inventory accumulation of certain specified materials, issued by the Director of Priorities, are not affected by the terms and

provisions of this order as issued.

(f) This order shall take effect on the 29th day of May, 1941, and unless sooner terminated shall expire on the 31st day of December, 1941.

Issued this 29th day of May, 1941.

E. R. Stettinius Jr.
Director of Priorities

Report Form PD-32

Customer's Statement of Failure to Obtain Required Delivery or Place Order for Pig Iron, Ferrous Alloys, Steel Ingots and Castings, or Carbon and Alloy Steel.

(This copy to be sent to the Division of Priorities, Office of Production Management, Washington)

.....
(Customer's Name)

.....
(Line of Business)

.....
(Customer's Address)

has attempted, without success, to place an order for certain of the above products as specified below, delivery date.....as follows:

1. Purpose for which customer intends to use material (Explain fully).

2. Priority rating, if any, of customer's order.

3. Customer hereby certifies that no date for delivery specified in the above named order is earlier than required to meet orders on hand, or to replace the aforesaid products so ordered.

Customer shall attach to this statement a certified copy of the Bill of Material giving number of pieces, specifications, weight and desired shipping dates, and giving order number, if any, covering same. (Unless such certified copy is so attached, this statement will not receive consideration by the Division of Priorities).

Customer will indicate the name and addresses of its usual suppliers for the materials specified in the above named order.

State names and addresses of the suppliers with whom customer has attempted to place the above named order. If space here provided is insufficient, add additional names on sheet of paper to be attached hereto:

State of Ohio.....)ss:
County of.....)

Sworn to before me this..... day of 1941.

.....Notary Public
My Commission expires .....

The undersigned being duly sworn deposes and says that (1) he executed the foregoing on behalf of and by authority of the above named customer: (2) the facts stated above are, to the best of his knowledge and belief, correct; (3) the amounts and dates of shipment above set forth are not in excess of the amounts actually required to produce the items listed above after making use of all inventory of the aforesaid products in all forms; (4) undersigned has filed with the Division of Priorities, Office of Production Management, Washington, an inventory of all the aforesaid products.

Signature of officer executing the foregoing .....
Title .....

Order Form PD-32a

No. (To be numbered consecutively)
To: .....
(Name of Producer)
..... (Address)

Following the receipt of a Report Form PD-32a from.....
(Customer's Name) .....(Address) that an order for pig iron, ferrous alloys, steel ingots and castings, or carbon and alloy steel dated as follows:.....(date) Order number (if any).....
Type or Grade .....
Priority Rating of Such Order if any .....
Amount and Date of Each Shipment required .....
was not accepted by you according to its terms, including dates of delivery.

You are hereby ORDERED to submit to the Division of Priorities, Office of Production Management, Social Security Building, Washington, within five days of the date hereof, a sworn statement on the form mailed to you herewith, showing why customer's
(delivery dates has been (deferred
(order (refused

E. R. Stettinius Jr.
Director of Priorities, Office of Production Management, Washington.

Mandatory Control Placed on Copper; 20 Per Cent Set Aside for Defense

Copper was added last week to the list of vital defense metals under mandatory, industry-wide control. Effective June 1, a tonnage amounting to 20 per cent of April production of 88,659 tons is being set aside for emergency requirements. The balance will be prorated among civilian consumers.

The new control is provided in a General Preference Order signed by E. R. Stettinius Jr., Director of Priorities, who said the action was made necessary by a shortage of copper which is expected to become worse during 1941.

At the same time, a Civilian Allocation Program for Copper was issued by Leon Henderson, OPACS.

The civilian plan takes into account the need for providing as much copper as possible for civilian uses; hardships which will be imposed on labor or business by restrictions; past rates of consumption by fabricators; the desirability of prorating copper as equitably as possible among fabricators; availability of substitutes. OPACS will refuse to allocate copper to any one in the industry discriminating against defense orders.

Available figures indicate that the total supply of refined copper in this country during 1941 will range between 1,340,000 and 1,470,000 short tons. Total military and civilian requirements, however, are estimated at about 1,810,000 short tons, thus indicating an overall shortage for the year of from 340,000 to 470,000 short tons.

Such a shortage is considered especially serious because copper is used widely in both civilian and military channels.

One of the problems involved is that, although the Reconstruction Finance Corp. is prepared to buy up to 500,000 tons of refined Chilean copper in 1941, there is a question as to whether the Chilean refiners can meet this schedule and also as to whether ships will be available to transport it. The figures previously given for anticipated supply of copper in 1941 are based on the expectation of getting a substantial part of the Chilean copper.

Major points in the order are:

(1) All defense orders which do not bear a higher preference rating are assigned a rating of A-10. This puts such orders ahead of nondefense orders with lower ratings or no ratings.

(2) If a copper supplier has both defense and nondefense orders, he may fill the nondefense orders without requiring preference rating certificates from customers so long as this does not interfere with the requirements that defense orders must be filled first and that delivery dates on defense orders must be met. He must, of course, comply with all terms of this order, including the requirement to set aside a reserve pool.

(3) Beginning June 1, refiners shall set aside each month an amount of copper, equal to 20 per cent to April production, which will be specifically allocated by the Director of Priorities to meet emergency needs. The remaining copper will be prorated among customers. Each refiner shall include in his production figures copper re-

fined for him under toll agreement but shall exclude copper refined by him for others.

(4) Beginning June 1, all copper then or thereafter owned by the Metals Reserve Co. (of the R.F.C.) will be allocated by the Division of Priorities.

(5) Copper is removed from the list of 16 metals and classes of metals subject to inventory control under General Metals Order No. 1, but the copper order itself provides inventory control and stipulates that customers' inventories may not be built up to excessive or unnecessary levels.

(6) The order is not intended to apply to the distribution of copper in fabricated or completed form (although any distributor of any copper products must comply with preference ratings) but is intended to govern the distribution of copper in prefabricated form. This has the effect of regulating the distribution and supply of copper by going to the primary industrial source of the metal.

(7) Copper, for the purpose of the order, is defined as "copper metal produced from ores or scrap which has been refined by any process of electrolysis, or produced from ores by any process of fire refining, to a grade, and in a form (cathodes, wire bars, ingot bars, ingots, cokes, billets, wedge bars or other refined shapes), suitable for fabrication. It shall also include any copper metal in the production of which copper scrap has been mixed with electrolytic or fire-refined copper produced from ores." Under the terms of this definition, the order does not regulate the distribution of copper scrap, in scrap form, and excludes copper metal of the kind known as "casting copper" which has been prepared wholly from scrap by ordinary fire refining or melting processes.

Maximum Prices Established for Nickel and Other Alloy Scrap

Price schedule No. 8 fixing ceiling prices for a wide variety of scrap and secondary materials containing nickel was issued last week by Leon Henderson.

The schedule, effective June 2, covers pure nickel scrap, ferro-nickel-chrome-iron scrap, ferro-nickel-iron scrap, monel metal scrap, cupro-nickel alloy scrap, stainless steel scrap, nickel steel scrap, secondary monel metal ingot, secondary monel metal shot, and secondary copper-nickel shot.

The schedule also fixes maximum prices for the straight chrome type of stainless steel scrap, which contains no nickel.

Recent prices received for this type of stainless steel scrap have been out of line and it was felt advisable to include it in the price schedule, together with the other types of stainless steel scrap.

Mr. Henderson explained frequently such prices have been double or triple the price of virgin nickel.

Except for stainless steel scrap and nickel steel scrap, basic maximum prices are established to apply on sales of scrap, unsuitable and unprepared for industrial consumption. However a premium is allowed any seller of scrap, termed a "converter", who performs all of the following functions:

(1) sells scrap directly to a consumer.

(2) by chemical test or assay, determines the metal constituents of the scrap,

(3) on that basis, sorts, grades, treats, packages or briquettes by hydraulic press, and otherwise prepares the scrap, for direct industrial consumption,

(4) guarantees the delivery of scrap in an agreed amount and analysis. Unless a seller of scrap satisfies all four criteria, he is not a converter and is not entitled to the converter's premium but must sell his scrap at not more than the basic maximum prices.

Quantity differentials are also established entitling any seller of scrap, whether he is a converter or not, to a premium for shipments of a specified quantity or more of material at one time. Thus a converter may be entitled to both the converter's premium and the quantity premium. Sellers who are not converters may nevertheless be entitled to the quantity premium.

The following indicates how the maximum prices are to be computed. For example, the basic maximum price established for a pound of Inconel, containing 80 per cent nickel, 14 per cent chrome, and 6 per cent iron, is 26½c per pound of nickel contained; 8c per pound of chrome contained, and no payment for the iron. The basic maximum price is thus 22.32 cents per pound. Any person shipping 10,000 pounds or more of Inconel at one time may receive 22.82 cents per pound, including a quantity premium of ½-cent. A converter, shipping 10,000 pounds or more may receive 24.32 cents per pound, including a converter's premium of 1½ cents per pound. A converter shipping less than 10,000 pounds may receive 23.82 cents per pound.

In addition to the basic maximum prices fixed for stainless steel scrap, a premium of $10 a ton is allowed for sales of scrap in the form of hydraulic press briquettes.

The maximum prices for nickel steel scrap are tied to the maximum prices established for steel scrap in the Iron and Steel Scrap Price Schedule No. 4, Revised. A grade of steel scrap containing less than 1 per cent nickel may not be sold at more than the maximum price for a like grade of steel scrap fixed in Price Schedule No. 4, Revised. The maximum price for a grade of steel scrap which contains 1 per cent or more nickel is the maximum price for a like grade of steel scrap fixed in Price Schedule No. 4, plus $1 per gross ton for each ¼ of 1 per cent of nickel content.

A broker's commission is allowed on sales of stainless steel scrap or nickel steel scrap. The broker's commission on stainless steel scrap is 5 per cent of the established maximum price; it is 2 per cent on nickel steel scrap.

The ceiling prices on secondary monel ingot, secondary monel shot, and secondary copper-nickel shot will bring the prices of these materials into line with the prices of equivalent secondary materials. Premiums are allowed for the sale of these secondary materials in smaller lots.

Maximum prices etablished in Price Schedule No. 8 went into effect on Monday, June 2, 1941, regardless of pre-existing contracts. However, permission will be granted to any person to carry out contracts entered into prior to May 30, 1941, the date on which Price Schedule No. 8 was published in the Federal Register, if such permission is necessary to protect such person against loss in the disposition of inventory already acquired at prices higher than the established maximum prices. Forms on which application for such permission may be made are available upon request made to the Office of Price Administration and Civilian Supply, Washington.

■ More than 2800 lapel emblems were awarded recently to employes of Worthington Pump & Machinery Corp., Harrison, N. J., for five or more years' service. Distribution of the emblems was made by H. C. Beaver, president, and nearly half the corporation's employes were so honored.

Plane Orders Comprise Two-Thirds Week's $612,889,964 Defense Awards

■ AIRCRAFT awards reported last week again comprised a large part of the $612,889,964 total contracts placed in the period by the War and Navy departments. Four contracts for airplanes, primarily bombers, totaled nearly two-thirds of the aggregate awards.

Contracts placed by the Navy were less than 20 per cent of the total. Ordnance equipment awards were heavier than in recent weeks. War department reported the following contracts were placed in the week:

Boeing Aircraft Co., Seattle, bombing planes, probably to be assembled at the government's new plant at Wichita, Kans., $95,242,000.

Consolidated Aircraft Corp., San Diego, Calif., bombing planes, probably to be assembled at the government's new plant at Ft. Worth, Tex., $226,636,200.

Jack & Heintz Inc., Cleveland, agreement of lease with Defense Plant Corp. for plant facilities including acquisition of machinery and equipment for production of aircraft electric starters. New plant, to cover 65,500 square feet, will be at or near the firm's present facilities in Cleveland.

Nash-Kelvinator Corp., Detroit, agreement of lease with Defense Plant Corp. for plant facilities, machinery and equipment at Lansing, Mich., for manufacture of Hamilton standard propeller assemblies and spare parts, $8,433,860.

Engineers' Corps Awards

Acme Steel Engineering Co. Inc., Baltimore, test nets, $2450.

American Concrete & Steel Pipe Co., South Gate, Calif., reinforced concrete pipe, Phoenix military airport, Litchfield park, Ariz., $50,818.50.

American Foundry & Mfg. Co., St. Louis, fire hydrants, Jefferson barracks, Missouri, $2697.90.

American Steel & Wire Co., Cyclone Fence Division, Ft. Worth, Tex., fencing materials, aircraft assembly plant, Tulsa, Okla., $3510.93; Glendale, Calif., Division, fence, Phoenix military airport, Litchfield park, Arizona, $8898.83.

Bethlehem Steel Co., Seattle, reinforcing steel, $8640.

Bruning, Charles, Co., Chicago, duplicating sets, printing equipment, $8583.50.

California Corrugated Culvert Co., Los Angeles, pipe and fittings, Phoenix military airport, Litchfield park, Arizona, $7863.34.

Caterpillar Tractor Co., Peoria, Ill., tractors, with bulldozers, $25,251.

Clow, James B., & Sons, Chicago, cast iron water pipe, Scott field, Illinois, $9480.22; National Cast Iron Pipe Division, Tarrant, Ala., pipe and fittings, Phoenix military airport, Litchfield park, Ariz., $12,532.60.

Clark Tructractor, Battle Creek, Mich., elevating Ford truck, $2578.60.

Colt's Patent Fire Arms Co., Hartford, Conn., electric dishwashers, Windsor Locks airport, Connecticut, $2317.50.

Consolidated Supply Co., Portland, Oreg., cast iron soil pipe, $11,200.

Crouse-Hinds Co., Syracuse, N. Y., searchlight units, $18,713.75.

Danes Dancker Lane Inc., New York, desks, $4925.

Dietzgen, Eugene, Co. Inc., Washington, planetable tripods, $5337.50.

Ditto Inc., Chicago, duplicating machines, $42,259.05.

Dorfman, Charles J., Los Angeles, air corps repair hangar and control tower, Tucson municipal airport, Arizona, $112,787.

Eastman Machine Co., Buffalo, rotary cloth cutters, $4200.

Electric Power Equipment Co., Columbus, O., motor generator sets, $2750.

Feenaughty Machinery Co., Bay City, Mich., mobile crane, $4338.

Flinn, Henry I., Montgomery, Ala., hangar and boiler house, Daniel field, Augusta air base, Georgia, $95,388.

Flockhart Foundry Co., Newark, N. J., manhole frames and covers, inlet grates and frames, Westover field, Chicopee Falls, Mass., $4167.

Flotation Systems Inc., Los Angeles, air-corps gasoline fueling system, Oklahoma City air base, Oklahoma, $101,780.

Fruehauf Trailer Co., Detroit, dollies, $34,124.

General American Transportation Corp., East Chicago, Ind., box cars, $12,803.

General Electric Co., Erie, Pa., locomotives, $23,650.

Gerber, Edwin C., Oregon City, Oreg., taxiways, Pendleton municipal airport, Oregon, $40,565.60.

Gibbons, M. J., Supply Co., Dayton, O., expansion joints and black pipe, Patterson field, Ohio, $3781.42.

Graybar Electric Co., Omaha, Nebr., stranded wire, Lowry field, Denver, $2263.14.

Gurley, W. & L. E., Long Island City, N. Y., lensatic compasses, $30,388.07.

Haffner-Thrall Car Co., Chicago, flat railroad cars, $9808.15.

Hillman, C. Kirk, Seattle, churn drills, $20,213.06.

Hobart Mfg. Co., Troy, O., kitchen equipment, Army airport, Ft. Wayne, Ind., $3045.05; kitchen equipment, Windsor Locks airfield, Connecticut, $2302.95.

Hudson, Frank, Steel & Wire Co., Tulsa, Okla., fencing materials, aircraft assembly plant, Tulsa, Okla., $2406.36.

Hughes Range Co., Tacoma, Wash., two-oven type, oil fired ranges, McChord field, Tacoma, Wash., $5298.

Inland Construction Co., Omaha, Nebr., excavation, fencing, electric wiring, Miles City airport, Montana, $94,735.70.

Kearney & Trecker Corp., West Allis, Wis., milling machines, $7435.75.

Korb, Joseph, Los Angeles, airport lighting system, Santa Monica municipal airport, California, $15,484.

Lindberg Engineering Co., Chicago, box-type electric heat treating furnaces, aircraft assembly plant, Kansas City, Kans., $24,990.

Link Belt Speeder Corp., Cedar Rapids, Iowa, spare parts for shovels, $22,224.62.

Lord & Burnham Co., Irvington, N. Y., balks, pontons and ponton trestles, $14,082.84.

Louisiana & Arkansas Railway Co., Alexandria, La., relay rails, $30,000.

Maurer, J. A., Inc., New York, motion picture cameras, $6628.18.

Means Construction Co., Norfolk, Va., searchlight storage building, Ft. Story, Virginia, $8690.

Mechanical Equipment Co., New Orleans, salt water reclaimers, $11,600.

Mitchel, Russ, Inc., Houston, paving runways and taxiway, Houston municipal airport, Texas, $348,882.25.

Montague Co., San Francisco, oil-fired bake ovens, $3460.

Northern Commercial Co., Seattle, compressor units and air receiver tanks, drag scraping unit, $12,733.40.

Novelty Ornamental Iron & Wire Works Inc., Seattle, structural steel, $4593.

O'Leary, Arthur J., & Sons, Chicago, pole clamping brackets, $2790.

Pacific States Cast Iron Pipe Co., Ironton, Utah, gate valves and valve boxes, $2306.42; iron and pipe, Hill field, Ogden, $16,123.34.

Piatelli, A., & Co., Mattapan, Mass., water distribution system, Windsor Locks airfield, Conn., $99,266.75.

Ransome Concrete Machinery Co., Dunellen, N. J., concrete mixers, $24,675.

Reno Steel & Metals Corp., Glendale, Calif., miscellaneous metal for photographic laboratory, $3380.20.

Ritter Bros., Harrisburg, Pa., temporary mess hall and guard house, Middletown air depot, Pennsylvania, $15,247.

Ruble Electric Supply Inc., New Kensington, Pa., steel conduit, $11,576.74.

Sayles, James E., Seattle, tugboat, $35,240.

Seattle Hardware Co., Minnequa, Colo., nails, $2334.88.

Seattle Plumbing Supply Co., Seattle, pipe fittings, $10,695.44.

Seeger Refrigerator Co., St. Paul, steel constructed ice refrigerators, Windsor Locks airfield, Connecticut, $3675; refrigerators, Sunset field, Spokane, Wash., $4018.32.

Sheldon, E. H., & Co., Muskegon, Mich., benches, $5301.31.

Silent Hoist Winch & Crane Co., Brooklyn, N. Y., mobile cranes, $5585.

Smith, Ivy H., Co., Jacksonville, Fla., water supply system, Jacksonville municipal airport, Florida, $19,994.50.

Smith Welding Equipment Corp., Minneapolis, welding and cutting outfits, $5427.42.

Smyth Donegan Co., Brooklyn, N. Y., cast iron bell and spigot pipe, hardware, pipe, valves, Mitchell field, Long Island, N. Y., $4541.

Soule Steel Co., San Francisco, fabricated steel windows, $12,209.79.

Standard Gas Equipment Corp., New York, gas ranges, bake ovens and deep fat fryers, Army airport, Ft. Wayne, Ind., $5128.70.

Star Drilling Machine Co., Akron, O., well drilling machines, $26,333.50.

Steel Products Supply Co., and U. S. Pipe Supply Co., Los Angeles, welded steel pipe, Phoenix military airport, Litchfield park, Ariz., $2107.

Steilberg, H. J., & Son, Valley Station, Ky., storehouse and utilities shop, Bowman field, Louisville, Ky., $11,086.

St. Paul Foundry Co., St. Paul, structural metal, $3693.

Sullivan Machinery Co., Michigan City, Ind., parts for air compressors, $5353.02.

Taylor-Winfield Corp., Warren, O., automatic flash welder, aircraft assembly plant, Kansas City, Kans., $2615.

Terry, J. H., & Co., Philadelphia, pier, Delaware ordnance depot, Pedricktown, N. J., $292,042.

Thew Shovel Co., Lorain, O., truck cranes, $38,710.

Todd Galveston Dry Docks Inc., Galveston, Tex., repairing dredge, $16,747.

Truck & Tractor Inc., Aberdeen, Wash., International truck chassis with cab, $3685.

Truscon Steel Co., Youngstown, O., prefabricated steel buildings, $21,059; steel reinforcing bars, Phoenix military airport, Litchfield park, Ariz., $3610.13.

Vanguard Construction Corp., New York, mine installation facilities, harbor defenses of Chesapeake Bay, Little Creek, Va., $246,790.

Vernon Bros. Co., Boise, Idaho, airport improvements, Baker municipal airport, Oregon, $122,798.60.

Wallace & Tiernan Co. Inc., Belleville, N. J., water purification units, $119,400.

Warner & Swasey Co., Cleveland, turret lathes, aircraft assembly plant, Kansas City, Kans., $4499.

Westinghouse Electric Supply Co., Seattle, electric material, $3052.38.

Wickes Engineering & Construction Co., Des Moines, lighting system, Bowman field airport, Louisville, Ky., $15,484.

Williams, White & Co., Moline, Ill., hydraulic presses, $25,400.

Wood, R. D., Co., Seattle, fire hydrants, $2547.50.

Wrought Iron Range Co., St. Louis,

coal ranges, Windsor Locks airfield, Connecticut, $3439.

Wrought Iron Kitchen Equipment Co., Boston, kitchen equipment, $9597.

Ordnance Department Awards

Aerial Machine & Tool Corp., New York, parts for rifle, $6740.27.

Albertson & Co. Inc., Sioux City, Iowa, drills, $2472.80.

Allis-Chalmers Mfg. Co., Milwaukee, parts for tractors, $54,902.28.

American Brass Co., Waterbury, Conn., copper, $1545.11.

American Car & Foundry Co., Berwick, Pa., parts for tanks, $6962.

American Cutter & Engineering Co., Detroit, punches, $6840.

American Hollow Boring Co., Erie, Pa., seamless steel tubes, $7450.

American Locomotive Co., Schenectady, N. Y., rough machine and heat treat alloy steel forgings, $3500.

American Metal Co. Ltd., New York, solder, $39,230.

American Petrometal Co., Long Island City, N. Y., bar steel, $1320.02.

Arguto Oilless Bearing Co., Philadelphia, punches, $3480.

Atlas Press Co., Kalamazoo, Mich., shapers, $2792.

Bantam Bearings Corp., South Bend, Ind., roller bearings, $1700.

Barrett, Leon J., Co., Worcester, Mass., oil extractors, $1246.

Bay State Tool & Machine Co., Springfield, Mass., parts for rifle, $14,568.09.

Bendix Aviation Corp., Eclipse Aviation Division, Bendix, N. J., parts and overhaul of tanks, $1817.05.

Blakeslee, G. S., & Co., Cicero, Ill., metal washing and rinsing machines, $2385.

Blanchard, Fred K., Inc., Troy, N. Y., grinding wheels, $6156.

Bliss, E. W., Co., Brooklyn, N. Y., presses, $14,721.

Bodine Corp., Bridgeport, Conn., install equipment for drilling machine, $5397.50.

Braeburn Alloy Steel Corp., Braeburn, Pa., steel, $4011.08.

Budd Wheel Co., Detroit, vehicle units and parts, tank parts, $22,984.

Carboloy Co. Inc., Detroit, turning tools, $5715.

Carpenter Steel Co., Reading, Pa., tool steel, $2244.

Carter, Milchman & Frank Inc., New York, twist drills and files, $1752.72.

Chevrolet Motor Division, Gear & Axle Division, Detroit, ammunition, $531,774.

Christiansen, C. B., Newark, N. J., fixtures, $2950.

Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati, milling machines, grinders, $24,933.

Clark Equipment Co., Clark Tructractor Division, Battle Creek, Mich., lift trucks, $4027.25.

Cleveland Cutter & Reamer Co., Cleveland, reamers and counterbores, $1440.

Cleveland Tractor Co., Cleveland, tractors, $1,820,000.

Colonial Electric Co., Philadelphia, stranded wire, $2157.25.

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., cam assemblies, $3443.92.

Continental Motors Corp., Muskegon, Mich., flywheel assemblies, $6278.40.

Continental Steel Corp., Superior Sheet Steel Co. Division, Canton, O., sheets, long terne plate, $60,620.80.

Copperweld Steel Co., Warren, O., steel bar, $46,117.50.

Daco Inc., Long Island City, N. Y., lens polishing machines, $5085.

Delta Mfg. Co., Milwaukee, grinders, $1004.50.

Derbyshire Machine & Tool Co., Philadelphia, spindles, $4150.

Eagle Grinding Wheel Co., Chicago, mounted points, $1107.

Edgcomb Steel Co., Philadelphia, tool steel, $1838.54.

Electromaster Inc., Detroit, fin assemblies, $7930.

Elliott-Lewis Electrical Co. Inc., Philadelphia, wire cables, $1568.59.

Ever-Tite Mfg. Co., Davenport, Iowa, grousers for tanks, $5890.

Ex-Cell-O Corp., Continental Tool Works Division, Detroit, milling cutters, grinders, $50,414.20.

Fafnir Bearing Co., New Britain, Conn., ball bearings, $3286.

Firestone Tire & Rubber Co., Noblesville, Ind., track assemblies, $151,481.

Firth-Sterling Steel Co., Philadelphia, bits, $1694.25.

Fischer, Charles, Spring Co., Brooklyn, N. Y., parts for rifle, $4404.40.

Fosdick Machine Tool Co., Cincinnati, radial drills, $19,300.

Frasse, Peter A., & Co. Inc., New York, cold drawn steel, $2965.34.

General Aniline & Film Corp., Ozalid Products Division, Johnson City, N. Y., dry developing machines, $1865.

General Electric Co., Davenport, Iowa, electric furnaces, $2625.

General Electric Supply Co., Philadelphia, voltage regulators, $1234.62.

General Fireproofing Co., Youngstown, O., rotary type stools, steel shelving, $6043.48.

General Tool & Mfg. Co., Irvington, N. J., tools, $12,075.

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., drilling and milling machines, $6,837,500.

Gorton, George, Machine Co., Racine, Wis., pantograph machines, $1996.50.

Graybar Electric Co. Inc., Philadelphia, stranded wire, $1643.75.

Greenlee Bros. & Co., Rockford, Ill., boring machine, $2466.50.

Halcomb Steel Co., Syracuse, N. Y., high speed tool steel and tool bits, $26,582.84.

Hamilton Watch Co., Lancaster, Pa., electrostatic recorders, $3786.45.

Hartford Electric Steel Co., Roxbury, Mass., steel castings, $2758.12.

High Standard Mfg. Co., New Haven, Conn., drills, $1770.

Ingersoll Milling Machine Co., Rockford, Ill., cutters, $1205.04.

International Nickel Co. Inc., Huntington, W. Va., cylinders and rods, $47,968.50.

Johnson, Justus & Son Co., Hartford, Conn., forging dies and resinkings, $4352.

Kehawke Mfg. Co., Minneapolis, tire spreaders, $1351.50.

Kingsbury Machine Tool Co., Keene, N. H., indexing machines, $28,820.

LaSalle Steel Co., Hammond, Ind., steel, $1074.69.

Martin-Parry Corp., York, Pa., high speed adapters, $80,610.50.

Maxon Premix Burner Co., Muncie, Ind., gas burners, $5457.80.

McKenna Metals Co., Latrobe, Pa., lathes and turning tools, $5093.

McShain Carrier Air Conditioning Corp., Philadelphia, air conditioners, $1393.50.

Medart, Fred, Mfg. Co., St. Louis, clothing lockers, $7501.

Mercury Mfg. Co., Chicago, gasoline tractors, $1265.20.

Midwest Tool & Mfg. Co., Detroit, step reamers, $3450.

Mitchell Mfg. Co., Milwaukee, folding tables, $1935.60.

Modern Machine Tool & Die Co., Bridgeport, Conn., dies, $16,800.

Molded Insulation Co. Inc., Philadelphia, pole plugs, $1612.40.

Mueller Brass Co., Port Huron, Mich., heads and firing plugs, $16,382.

Multigraph Sales Agency, Washington, duplicating machines, $1480.62.

Nash Engineering Co., South Norwalk, Conn., pumps and receivers, $1381.

National Lock Washer Co., Newark, N. J., rough drop forgings, $1288.

National Tube Co., McKeesport, Pa., ammunition, $2,450,000.

Niles-Bement-Pond Co., Pratt & Whitney Co. Division, Hartford, Conn., gages, attachments, $7705.08.

Northern Sales Co., Philadelphia, files and screws, $1382.13,

Norton Co., Worcester, Mass., equipment for grinding machines, $1170.74.

Onsrud Machine Works Inc., Chicago, boring machines, routers, $5419.

Otis Steel Co., Cleveland, structural steel, $2802.92.

Parent Metal Products Inc., Philadelphia, benches, cabinets and parts, steel shelving, $10,788.30.

Philadelphia Metal Works Inc., Philadelphia, punches, $2196.

Poor & Co., Canton Forge & Axle Works Division, Canton, O., steel drop forgings, $5161.38.

Prescott Co., Menominee, Mich., lathes, $682,500.

Proctor & Schwartz Inc., Philadelphia, drying machines, $1880.

Producto Machine Co., Bridgeport, Conn., milling machines, $6725.

Rapp, W. A., Philadelphia, chucks and collets, $1272.75.

Remington Arms Inc., Bridgeport, Conn., percussion element assemblies, $4921.

Revere Copper & Brass Inc., New Bedford, Mass., sheet brass, $2731.49.

Robertshaw Thermostat Co., Youngwood, Pa., booster parts, $278,908.80.

Saginaw Stamping & Tool Co., Saginaw, Mich., parts for trailers, $27,722.87.

Shaw-Walker Co., Muskegon, Mich., desks, $1087.32.

Simonds Saw & Steel Co., Boston, high-carbon cutters, $1350.

Sipp-Eastwood Corp., Paterson, N. J., assembling and tensioning fixtures, $4394.

Springfield Stamp & Die Co., Springfield, Mass., steel stamps, $6062.75.

Square D Co., Detroit, two pole switches, $1610.63.

Standard Machinery Co., Providence, R. I., cylinder heads, $4267.

Standard Shannon Supply Co., Philadelphia, files, $1080.79.

Starrett, L. S., Co., Athol, Mass., calipers, gages, dial indicators, $1745.76.

Sturtevant, B. F., Co., Camden, N. J., electrical equipment, $1150.

Taft-Peirce Mfg. Co., Woonsocket, R. I., gages, $2141.

Timken-Detroit Axle Co., Wisconsin Axle Division, Oshkosh, Wis., parts for tanks, oil pump assemblies, $11,205.80.

Tomkins-Johnson Co., Jackson, Mich., angle cutters, $1666.

Triad Tool & Die Co., Newark, N. J., fixtures, cutters, washers and strippers, $1772.

Triumph Explosives Inc., Elkton, Md., detonator assemblies, $425,000.

Union Twist Drill Co., Athol, Mass., drills, $8678.32.

United Shoe Machinery Corp., Beverly, Mass., steel drop forgings, $1387.80.

Universal-Cyclops Steel Corp., Titusville, Pa., high speed steel, $1014.70.

Universal Metal Products Co. Inc., New York, tools, $89,160.

Vinco Corp., Detroit, gages, $7902.95.

Wall Colmonoy Corp., Detroit, alloy strips, $1434.45.

Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., motor driven presses; loading machines; and gaging and weighing machines, $32,345.

Wharf Machine & Electric Co. Inc., Boston, cylinder heads and guards, $2201.50.

Yoder Co., Cleveland, cartridge cases, $1500.

Signal Corps Awards

Allen-Bradley Co., New York, resistor assemblies, $315.

American Automatic Electric Sales Co., Chicago, telephone equipment, $122,172.80.

Cornelius, H. M., Co., New York, soldering equipment, $812.

Electrical Mfg. Co., Battle Creek, Mich., anchors and anchor rods, $5345.96.

Gaffney-Kroese Electric Supply Co., St. Louis, cut-outs, $707.25.

General Electric Co., Schenectady, N. Y., radio equipment, $874.65.

General Electric Supply Corp., Syracuse, N. Y., conduit fittings, $1918.99.

General Fireproofing Co., Youngstown, O., office furniture, $1747.90.

Graybar Electric Co. Inc., New York,

cable, switchboards, test sets, $251,-301.18.

Gussack Machined Products Co. Inc., Long Island City, N. Y., couplings, $11,541.

Highway Trailer Co., Edgerton, Wis., cable reel trailers, $1190.

Hobb Electrical Supply Inc., Hastings, N. Y., potheads, $2080.

Memco Engineering & Mfg. Co. Inc., Long Island City, N. Y., bus supports, $3150.

R.C.A. Mfg. Co. Inc., Camden, N. J., crank assemblies, $385.

Ray-O-Vac Co., Madison, Wis., batteries, $15,207.76.

Teletype Corp., Chicago, teletypes, $2369.79.

Underwood Elliott Fisher Co., Bridgeport, Conn., accounting machine parts, $11,400.

Western Electric Co. Inc., Kearny, N. J., switchboard equipment, $3516.50.

Weston Electrical Instrument Corp., Newark, N. J., volt-ohmeters, analyzing equipment, $19,455.

Medical Corps Awards

American Hard Rubber Co., Butler, N. J., developing tank with base, $4800.

Buck X-Ograph Co., St. Louis, cassettes and intensifying screens, $27,597.50.

Crescent Mfg. Co., Fremont, O., operating knife handles, $5412.

Harrisburg Steel Corp., Harrisburg, Pa., seamless steel cylinders, $640.

Katzinger, Edward, Co., Chicago, bake pans, $6490.31.

Kriser, J., Corp., New York, surgical equipment, $1214.25.

Oneida Ltd., Oneida, N. Y., table knives, $11,820.

Ritter Dental Mfg. Co. Inc., Rochester, N. Y., dental operating equipment, $305,069.

Spencer Lens Co., Buffalo, folding magnifiers, $792.

Western Instrument & Mfg. Co., Chicago, surgical instruments, $550.

Chemical Warfare Service Awards

Beer, William J., Co. Inc., New York, clasps and blanking and swedging dies, $24,330.

Bethlehem Steel Co., Bethlehem, Pa., tinplate, $3453.28.

Crown Cork & Seal Co. Inc., Crown Can Co. Division, Philadelphia, container assemblies, $129,750.

Doehler Die Casting Co., New York, nozzles, $139,861.78.

Fischer, Charles, Spring Co., Brooklyn, N. Y., springs, $12,720.

Parker Metal Decorating Co. Inc., Baltimore, tinplate, $8990.48.

United Carr Fastener Corp., Cambridge, Mass., brass buttons and washers, $8143.21.

Air Corps Awards

Austin-Western Road Machinery Co., Aurora, Ill., sweepers, $428,170.

Bendix Aviation Corp., Eclipse Aviation Division, Bendix, N. J., pump assemblies, $108,141.

Boeing Aircraft Co., Stearman Aircraft Division, Wichita, Kans., maintenance parts for airplanes, $156,876.90.

Fairchild Engine and Airplane Corp., Ranger Aircraft Engine Division, Farmingdale, L. I., New York, engines and spare parts, $954,667.08.

Hudson Motor Car Co., Detroit, airframe parts (educational order), $821,718.96.

Kinsey, E. A., Co., Cincinnati, lathes, $35,377.51.

Pump Engineering Service Corp., Cleveland, pump assemblies, $523,693.

Prest-O-Lite Battery Co. Inc., Indianapolis, batteries, $57,660.

Sperry Gyroscope Co., Brooklyn, N. Y., controls, mount assemblies, oil pressure valves, regulators and oil filters, $598,183.74.

United Aircraft Corp., Hamilton Standard Propeller Division, East Hartford, Conn., maintenance parts, $52,441.24.

Vickers Inc., Detroit, pump assemblies, $322,344.

Wright Aeronautical Corp., Paterson, N. J., superchargers, $83,825.

Quartermaster Corps Awards

Aluminum Cooking Utensils Co., New Kensington, Pa., aluminum pots, coffee filters with fitting rings, $380,438.11.

Aluminum Products Co., LaGrange, Ill., aluminum pitchers, $61,373.19.

Bowen, John, Co., Boston, three barracks and four shops, Ft. Devens, Massachusetts, $68,500.

Choctaw Boat Works Inc., Mobile, Ala., 26-foot motor whale boats, $30,000.

Coleman Construction Co., Providence, R. I., ordnance shop, boiler house, ordnance warehouses and portable steel magazines, Ft. Ethan Allen, Vermont, $103,352.

Cooperage Corp., Seymour & Peck Co. Division, Chicago, flour sieves, $2688.34.

Dockstader, S. E., Inc., Washington, steam distribution system and additional heating facilities, Jeffersonville quartermasters depot, Jeffersonville, Ind., $154,500.

Dodge, Horace E., Boat & Plane Corp., Newport News, Va., 42-foot rescue boats, $385,965.

Edlund Co., Burlington, Vt., mechanical can openers, $61,600.

Enterprise Mfg. Co. of Pennsylvania, Philadelphia, meat and food chopper machines, $60,980.94.

Equitable Equipment Co., New Orleans, 55-foot steel tug, $39,250.

Gray & Dudley Co., Nashville, Tenn., cast iron griddles, $43,545.60.

Lalance & Grosjean Mfg. Co., Woodhaven, L. I., N. Y., hot tinned ladles, wire egg whips, $6278.98.

Landers, Frary & Clark, New Britain, Conn., butchers' steels, $4482.80.

McMichael Construction Co., Shreveport, La., two barracks, Camp Polk, Louisiana, $16,800.

National Supply Co., Philadelphia, diesel equipment for boats, $58,104.

Nunnelly, F. A., San Antonio, Tex., two storehouses, San Antonio arsenal, Texas, $40,844.

Pearce-Williams Contracting Co., Columbus, Ga., reservoir at Ft. Benning, Georgia, $31,729.

Peaslee-Gaulbert Corp., Louisville, Ky., dry cell batteries, $1170.

Sortwell, Daniel R., Boston, 66-foot launch, $2500.

Sutton Line Inc., New York, utility boat, $15,000.

Trapp-Carroll Co., Columbus, O., clothing renovating plant and boiler house, Columbus general depot, Columbus, O., $355,000.

Utica Cutlery Co., Utica, N. Y., boning knives. $1351.78.

Vinton Construction Co., Silver Spring, Md., install generator set in water filtration plant, Big Bethel, Va., $23,-500.

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Navy department reported the following contracts last week:

Arma Corp., Brooklyn, N. Y., ordnance equipment, $1,992,060.

Bethlehem Steel Co., Bethlehem, Pa., ordnance equipment, $1,446,000.

Bridgeport Brass Co., Bridgeport, Conn., ordnance equipment, $3,965,730.

International Nickel Co. Inc., New York, ordnance equipment, $2,465,845.

Northern Pump Co., Minneapolis, ordnance equipment, $43,605,000.

Bureau of Yards and Docks Awards

Crandall Engineering Co., Boston, reconstruction of marine railway at Boston navy yard, on a cost plus fixed fee basis, $100,000.

Fitzgerald, J. F., Construction Co., Boston, $400,000 supplemental contract for additional work on new pier. Total estimated cost of work contracted is about $1,125,000.

Fuller, George A., Co., and Merritt Chapman & Scott Corp., New York, supplemental agreement for additional purchase and assembly of materials and equipment for advanced bases at St. Lucia; British Guiana; Jamaica, British West Indies; Antigua, British West Indies; and other advanced bases. Also construction of assembly and shipping depot in vicinity of naval air station, Quonset Point, R. I. Total estimated cost, including fee, of this supplemental agreement, is $22,800,000.

General Electric Co., Schenectady, N. Y., improvement of electric distribution system substations at Puget Sound navy yard, Bremerton, Wash., $266,-521.

Johnsen, Ole, extension and remodeling barracks building, improvements on radio station, Eureka, Calif., $14,610.

McLean Contracting Co., Baltimore, supplemental agreement of $2,781,100 for additional facilities and work at the naval fuel depot, Craney Island, and at naval operating base, Norfolk, Va.

Myers Bros. and J. E. Haddock Ltd., Los Angeles, naval ammunition depot at Fallbrook, Calif., at total estimated cost of $1,800,000.

Osborne Construction Co. Inc., New York, stiff-leg derrick with operating hoist at naval net depot, Staten Island, N. Y., $8445.

Pessagno, E. A., Co., Washington, quarters for operators at naval academy radio station, Annapolis, Md., $127,-490.

Wheeler, C. H., Mfg. Co., Philadelphia, condenser and auxiliaries at Philadelphia navy yard, $22,975.

Wigton-Abbott Corp., and Mahony-Troast Construction Co., Plainfield, N. J., additional storage facilities at supply depot, Bayonne, N. J., $5,723,-000.

Bureau of Supplies and Accounts Awards

Aluminum Cooking Utensil Co., New Kensington, Pa., powder containers, $860,664.

Aluminum Products Co., La Grange, Ill., platters, $18,112.50.

American Bearing Corp., Indianapolis, Satco bearings for emergency spares, $162,976.68.

American Smelting & Refining Co., Federated Metals Division, New York, manganese bronze, $110,493.60.

American Zinc Sales Co., New York, zinc oxide, $20,351.25.

Amthor Testing Instrument Co. Inc., Brooklyn, N. Y., gage testing outfits, $16,652.50.

Anaconda Wire & Cable Co., New York, cable, $65,352.50.

Armstrong Bros. Tool Co., Chicago, wrenches, $23,787.16.

Atlas Steels Ltd., Welland, Ont., stainless steel ingots, $900,000.

Baldt Anchor Chain & Forge Co., Chester, Pa., anchor chain, $12,108.20.

Batteryless Telephone Equipment Co. Inc., Pittsburgh, cables, $35,745.

Bendix Aviation Corp., Bendix Products Division, South Bend, Ind., parts for hydraulic gun charger, $379,100; Julien P. Friez & Sons Division, Baltimore, radio sondes equipment, $13,950.

Bethlehem Steel Co., Bethlehem, Pa., steel nuts, $111,365.15.

Billings & Spencer Co., Hartford, Conn., wrenches, $24,743.94.

Bostitch Inc., East Greenwich, R. I., paper-fastening machines, $35,100.

Calumet & Hecla Consolidated Copper Co., New York, ingot copper, $60,250.

Carey Machinery & Supply Co., Baltimore, single surfacer planers; hand planers and jointers; knife grinder and jointer attachments, $7271.77.

Caswell Strauss & Co. Inc., New York, grade A pig tin, $291,536.

Chase Brass & Copper Co. Inc., Waterbury, Conn., naval brass, $174,887.04.

Cincinnati Milling Machines & Cincinnati Grinders Inc., Cincinnati, tools for Cincinnati milling machines, $10,162.30.

Copperweld Steel Co., Warren, O., corro-

sion-resisting bar steel, $49,219.
Crane Co., Chicago, valve disks, $16,-377.16.
Dempster Bros. Inc., Knoxville, Tenn., buckets, $9300.
Detecto Scales Inc., Brooklyn, N. Y., counter scales, $5621.20.
DeVry Corp., Chicago, sound motion picture equipments, $125,892.56.
Fairbanks, Morse & Co., Chicago, scales, $9713.77.
General Cable Corp., New York, cable, $275,262.50.
General Electric Co., Schenectady, N. Y., generators, $11,342.50.
Hamilton Watch Co., Lancaster, Pa., navigational aircraft watches, $45,375.
Hartzell Industries Inc., Hartzell Propeller Co. Division, Piqua, O., aluminum alloy aircraft propeller blades, $5004.
Insinger Machine Co., Philadelphia, dishwashing machines, $74,121.45.
International Harvester Co., Chicago, motor trucks, $7700.
International Minerals & Metals Corp., New York, metallic mercury, $14,136.
Jaeger Watch Co. Inc., New York, tachometers, $264,670.
Keystone Mfg. Co., Buffalo, wrenches, $5567.87.
Koppers Co., American Hammered Piston Ring Division, Baltimore, piston rings, $5780.
Langelier Mfg. Co., Cranston, R. I., swaging, rotary machines, $9062.
Lodge & Shipley Machine Tool Co., Cincinnati, precision lathe, $6893.
McKay Co., Pittsburgh, chains and fittings, $348,421.73.
Mineral Pigments Corp., Muirkirk, Md., yellow zinc, $6970.
National Electric Products Corp., Pittsburgh, cable, $6862.50.
National Tube Co., Pittsburgh, seamless steel tubing, $9900.74.
Ohio Piston Co., Cleveland, pistons, $11,182.60.
Okonite Co., Passaic, N. J., cable, $32,-422.50.
Pacific Marine Supply Co., Seattle, pumps, $106,471.66.
Phelps Dodge Copper Products Corp., Habirshaw Cable & Wire Division, New York, cable, $13,245.
Pittsburgh Lectromelt Furnace Corp., Pittsburgh, electric arc furnace, $15,-245.
Pittsburgh Steel Co., Pittsburgh, boiler tubes, $38,460.
Quicksilver Producers Association Inc., San Francisco, metallic mercury, $6225.
Republic Steel Corp., Cleveland, regular steel nuts, $41,967.90.
Revere Copper & Brass Inc., Baltimore, naval and commercial brass and plain brass angles, $806,807.55.
Richmond Engineering Co. Inc., Richmond, Va., buoys, $18,538.
Roebling's, John A., Sons Co., Trenton, N. J., cable, $36,875.
Shepherd Chemical Co., Cincinnati, manganese linoleate, $9437.50.
Shepard Niles Crane & Hoist Corp., Philadelphia, cranes, $30,052.
Steuart Motor Co., Washington, trucks, $5396.09.
Trimont Mfg. Co., Roxbury, Mass., wrenches, $43,612.56.
United Aircraft Corp., Hamilton Standard Propeller Division, East Hartford, Conn., pitch change indicators, $5000.
Universal Washing Machinery Co., Nutley, N. J., dishwashing machines, $13,-520.
Vollrath Co., Sheboygan, Wis., water pitchers and tureens, $234,360.
Walworth Co., New York, wrenches, $18,-590.17.
Weinman Pump Mfg. Co., Columbus, O., fire & flushing pumps, $13,430.
Williams, J. H., & Co., New York, wrenches, $39,065.08.
Woodhouse Chain Works, Trenton, N. J., chains and fittings, $13,818.89.
Worthington Pump & Machinery Corp., Harrisburg, Pa., motor driven and turbine driven pumps, $57,366.50.
Yale & Towne Mfg. Co., Philadelphia, electric truck, $8170.

Canada's War Awards $64,859,540 in Week

TORONTO, ONT.

■ Canada's expanding war production program is reflected in the increasing volume of war orders placed weekly, according to the Department of Munitions and Supply. In the week ended May 23, 2857 contracts with aggregate value of $64,859,540 were awarded. United States companies' total was $11,158,465. Orders to Canadian companies:

Munitions: Dominion Arsenals Ltd., Ottawa, Ont., $42,122; N. Slater Co. Ltd., Hamilton, Ont., $30,252.

Ordnance: John Inglis Co. Ltd., Toronto, $13,000; Small Arms Ltd., Long Branch (Toronto), $59,400; Burton Lumber Co. Ltd., Toronto, $12,901; Western Steel Products Ltd., Ottawa, $60,665; John Hay & Co. Ltd., Ottawa, $24,960; Canadian Power Boat Co. Ltd., Montreal, Que., $87,449; Air Ministry, England, $27,970.

Tools: Arlington Cycle & Sports Ltd., Montreal, $13,607; Union Twist Drill Co. Ltd., Rock Island, Que., $16,979; War Office, England, $22,378.

Machinery: Laurentide Equipment Co. Ltd., Montreal, $7876; Canadian Fairbanks-Morse Co. Ltd., Ottawa, $11,745.

Electrical equipment: Canada Wire & Cable Co. Ltd., Montreal, $12,303; Canadian Marconi Co., Montreal, $9647; Canadian General Electric Co. Ltd., Ottawa, $14,754.

Instruments: Ontario Hughes-Owens Co. Ltd., Ottawa, $132,370; General Motors Products of Canada Ltd., Oshawa, Ont., $6075; Research Enterprises Ltd., Toronto, $17,706; Stanley Mfg. Co. Ltd., Toronto, $18,890; Canadian Westinghouse Co. Ltd., Hamilton, Ont., $21,843; Ford Motor Co. of Canada Ltd., Windsor, Ont., $7780.

Land transport: International Harvester Co. of Canada Ltd., Ottawa, $5843; General Motors Products of Canada Ltd., Oshawa, $7761; Bickel-Seagrave Ltd., Woodstock, Ont., $30,320; Ford Motor Co. of Canada Ltd., Windsor, $1,391,233.

Aircraft: Air Ministry, England, $30,-000; Fairchild Aircraft Ltd., Longueuil, Que., $15,000; Aviation Electric Ltd., Montreal, $25,452; Canadian Car & Foundry Co. Ltd., Montreal, $18,167; Canadian Wright Ltd., Montreal, $134,-325; Coleman Lamp & Stove Co. Ltd., Toronto, $204,338; Cordage Distributors Ltd., Toronto, $6256; DeHavilland Aircraft of Canada Ltd., Toronto, $391,071; National Steel Car Corp. Ltd., Malton, Ont., $5280; Fleet Aircraft Ltd., Ft. Erie, Ont., $47,216.

War construction projects: M. A. Condon & Son, Kentville, N. S., $126,283; Hill-Clark-Francis Ltd., New Liskeard, Ont., $661,883; Shoquist Construction Ltd., Saskatoon, Sask., $288,760; Bennett & White Construction Co. Ltd., Calgary, Alta., $356,363; Buchan Construction Co., Calgary, $206,892; Rhodes, Curry Ltd., Amherst, N. S., $140,000.

Miscellaneous: Horton Steel Works Ltd., Toronto, $28,025; Gurney Foundry Co. Ltd., Toronto, $14,377; Howard Furnace Co., Toronto, $30,045; Metals Ltd., Calgary, $11,692; Canadian Johns-Manville Co. Ltd., Ottawa, $15,416; Northern Electric Co. Ltd., Ottawa, $45,670; Galt Malleable Iron Co. Ltd., Galt, Ont., $5634; Heaps Engineering Co. Ltd., New Westminster, B. C., $10,800; C. O. Monat & Co. Ltd., Montreal, $14,652; Ontario Hughes-Owens Co. Ltd., Ottawa, $9614; Dominion Bridge Co. Ltd., Lachine, Que., $73,000; Buchan Construction Co., Calgary, $24,000; Nelson River Construction Co., Winnipeg, Man., $7000; Bennett & White Construction Co., Calgary, $45,000; Marion-Wilson Ltd., Montreal, $60,000.

Plane Especially Developed for Aerial Surveys

■ Designed especially for aerial photographic surveying and mapping, this plane allows the pilot to see both forward and down and thus fly an accurate map. It was developed for the Abrams Aerial Survey Corp., Lansing, Mich.

■ Manufacturing industry backlogs, at a new record high, are nearly five times greater than the average in 1935-39 and more than three and one-half times those reported a year ago, according to National Industrial Conference Board, New York.

Activities of Steel Users, Makers

■ NEW engineering building of The Austin Co., Cleveland, was recently dedicated to the memory of Wilber J. Austin, president of the engineering and construction organization from 1924 until his death last December. Several hundred members of the company's Cleveland staff, with their families, participated. The ceremony was held in the paneled entrance lobby, alongside a photo mural which reviews 63 years of Austin history and progress.

♦

Allegheny Ludlum Steel Corp., Pittsburgh, has formed a committee for conservation of strategic materials to act as a clearing point for its technical activities on this subject. Members are V. B. Browne, vice president in charge of research, and C. A. Scharschu, director of research and metallurgy, both at the Brackenridge, Pa., plant; R. P. De Vries and W. R. Breeler, associate directors of research, respectively, at the Watervliet and Dunkirk, N. Y., plants.

♦

Lafayette Steel Corp., Chicago, was host May 24 to 1200 customers and guests at the formal opening of its new plant and warehouse. The company recently completed and occupied a new $150,000, one-story brick and steel building at 4130 West Forty-second place, affording 40,000 square feet of space.

♦

Frederick Post Co., Chicago, has appointed John R. Cassell Co., 110 West Forty-second street, New York, representative in metropolitan New York, for its line of engineering and architectural instruments.

♦

Logan Engineering Co., Chicago, has appointed J. A. McCoy, Des Moines, representative for the state of Iowa.

♦

Sarco Co. Inc., New York, has appointed Thermal Products Co., Cleveland, representative in Cleveland and northeastern Ohio.

♦

Triplex Screw Co., Cleveland, has completed a new building 80 x 100 feet, adjoining its plant on Grant avenue. The second unit acquired in the past two years, the building houses additional heat treating facilities and warehouse space.

♦

American Engineering Co., Philadelphia has appointed the following representatives for its hoists: George C. Lever Co., 50 Church street, New York, for New Jersey, greater New York and Long Island; George J. Sturmfelsz, 1208 Southview avenue, Baltimore, for Maryland; H. E. Mensch, 424 Book building, Detroit; and American Steel Export Co., 347 Madison avenue, New York, for some foreign markets.

♦

Dardelet Threadlock Corp., 55 Liberty street, New York, has moved its executive offices to the Machinery building, East Grand boulevard, Detroit, for closer contact with the center of the automobile industry.

♦

Niagara Junction railway, Niagara Falls, N. Y., has purchased two 50-ton electric locomotives from Iron & Steel Products Inc., Chicago.

♦

Effective June 2 the name Morrison Machine Products division of Hardinge Bros. Inc., Elmira, N. Y., was discontinued and business carried on under the name of Hardinge Bros. Inc.

♦

National Carbon Co. Inc., electrode division, New York, opened a sales office at 1810 Clark building, Pittsburgh, June 1, in charge of F. S. Haggerson.

♦

Kent-Owens Machine Co., Toledo, O., has appointed Calco Machinery Co., Philadelphia, exclusive agent for its milling machines in that territory.

♦

Allis-Chalmers Mfg. Co.'s district office at Toledo, O., of which W. R. Mengel is manager, is now located in the Toledo Trust building.

♦

Morris Machine Works, Baldwinsville, N. Y., has appointed H. J. Lynch, 403 Kales building, Detroit, representative in that district.

♦

Lintern Corp., has moved its office and factory from 7960 Lorain avenue, Cleveland, to 60 Lincoln avenue, Berea, O.

♦

Halcomb division of Crucible Steel Co. of America has placed the first of six gas producing units in operation at Syracuse, N. Y. Gas will be used for reheating semi-finished material.

♦

Weiland Tool & Die Co. Inc., Chicago, a new company which started operations several months ago employing eight persons, has increased its payroll to 20. Orders reflect heavy demands for defense work.

♦

Main office of Allis-Chalmers Mfg. Co., Milwaukee, from June 15 to Labor day will operate on a summer schedule, with working hours of 7:15 a.m. to 4:00 p.m. instead of 8:15 a.m. to 5:00 p.m., central standard time. The decision was based on a survey in which a majority of office employes expressed themselves in favor of the change.

♦

Saws Six Hours, Only Notches Bar

■ **Soft steel bars in which tool steel inserts are located slightly below the surface recently resisted efforts by this ironworker to cut them with a hacksaw. After sawing for six hours, the tester had worn out six saw blades, had cut only one-sixteenth of an inch into the bar. The bars are being installed in New York's new jail in the Criminal Courts building, Centre and Franklin streets. NEA photo**

♦

Pratt & Whitney Expands Gagemaking Facilities

■ Pratt & Whitney Division, Niles-Bement-Pond Co., dedicated its new 48,000-square-foot gage building to national defense in a ceremony at West Hartford, Conn., May 23. In attendance were 70 distinguished guests, including manufacturers, military representatives and civic officials, and the company's employes.

Visitors were conducted on a tour of the plant, ending with an inspection of the many standard and special gages to be produced. Part of the building extends the previous constant temperature room so that this area now totals 16,800 square feet. Temperature here is controlled within 1 degree of 68 degrees Fahr., day and night the year round.

Clayton R. Burt, Pratt & Whitney president, introduced the following speakers for the dedication ceremony, which was broadcast: Col. Frederick H. Payne, district chief, Hartford ordnance district; Odell Shepard, lieutenant governor of Connecticut; Thomas J. Spellacy, mayor of Hartford; Col. E. A. Deeds, chairman of the board, Niles-Bement-Pond Co.; Brig. Gen. G. M. Barnes, ordnance office, Washington; and Charles M. Pond, vice president and manager of the gage department.

Mr. Pond was presented a special gage by William J. Walsh, veteran of 46 years with Pratt & Whitney. Mr. Pond in turn presented the gage to General Barnes to symbolize the company's co-operation with the government in national defense.

Merz Engineering Co. Completes New Plant

■ Formal opening of Merz Engineering Co.'s new 36,000-square-foot plant at Indianapolis was observed May 28 with an open house attended by engineers and industrialists. Company manufactures A. G. D. gages, special machine tools, jigs and fixtures, employs 200 persons, and will add another 200 skilled craftsmen by Aug. 31.

Founded in 1927 by Col. Charles C. Merz to manufacture parts and engines for aircraft, the company later turned its attention to experimental engineering and designing, and machine tool manufacture.

The plant building, of brick and steel construction, is divided into four sections: Office areas; engineering department; precision grinding, jig boring and inspection rooms; and the main production area. Floors throughout are of reinforced concrete covered with wood block. Floors in the inspection, grinding and jig boring rooms are 3½-foot monolithic concrete slab laid in 3½-inch cork insulation; boring mill pits in the main production department are similarly floored.

Offices, engineering department, jig boring, grinding and inspection departments are air conditioned. The inspection room has its separate system which maintains a constant temperature of 68 degrees Fahr. within ½-degree, with humidity controlled to 50 per cent within 1 per cent.

Officers of the company are: Chairman, A. W. Herrington; president, Charles C. Merz; vice president, Bert Dingley; secretary, D. L. Glossbrenner; treasurer, Earl J. Breech.

■ Clayton R. Burt, Pratt & Whitney president, addresses assembled workers at the dedication of company's new gage plant, upper photo. Below, part of the assemblage of P. & W. craftsmen at the ceremony

Willys Expanding Forging Facilities

■ Large-scale production of aluminum forgings, necessary for military aircraft and other defense implements, will be under way by next fall in the Willys-Overland Motors Inc. plant in Toledo, O. A loan of $2,172,000 from the Defense Plant Corp. is being used to convert part of the company's forge shop to aluminum work with capacity of 40,000 pounds daily. When completed the shop will have 48 hammers.

A special machine shop for finishing work will be part of Willys' new plant, and the aluminum forgings will be shipped to aircraft manufacturers in finished as well as unfinished form. It is understood an initial order for $7,000,000 of forgings has been granted the company, although details have not yet been decided.

■ Methods of constructing air raid shelters are described in a War Department pamphlet issued recently and distributed to state and local defense councils by Frank Bane, director, Office of Emergency Management's division of state and local co-operation.

Industry Modernizes Facilities To Meet Growing Defense Demands

■ TO MEET growing demands of the national defense program, iron and steel companies are rehabilitating blast furnaces, open hearths and coke ovens, many of which have been long idle.

Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., has purchased a blast furnace near Holt, Ala., formerly the property of the Central Iron & Coal Co., which will be rehabilitated and placed in service within 90 days. The stack was built in 1903 and has been idle since 1929. When reconditioned, it will produce about 325 tons of foundry iron daily.

Ore will be supplied from Tennessee Coal & Iron's Red Mountain mines near Birmingham. Coke will be obtained from the Warrior River Coke Co., adjacent to the furnace. The coke plant, idle since 1931, has just been rehabilitated.

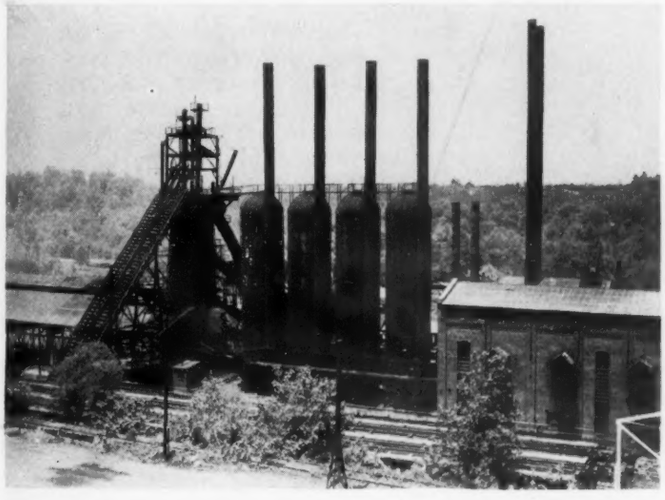
Under a lease agreement with Tennessee Products Corp., Nashville, Tenn., the Defense Plant Corp. has allocated an additional $75,000 to recondition a blast furnace at Rockdale, Tenn. The original agreement contained a $375,000 commitment.

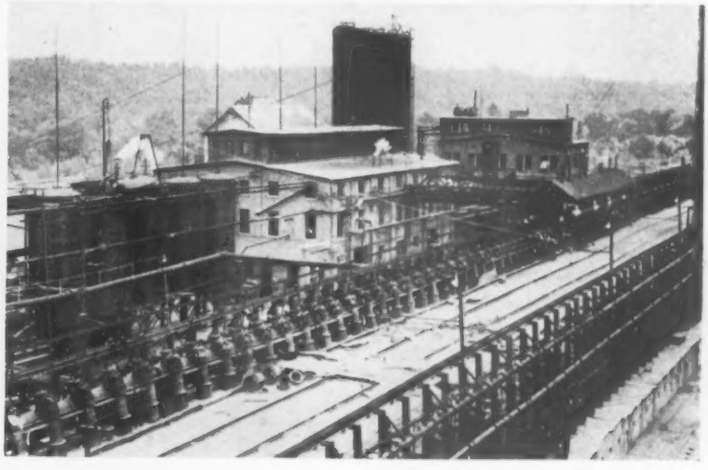
The Chester, Pa., blast furnace of the Delaware River Steel Co. has been acquired by the Philadelphia Electric Co., which is starting to rebuild its idle by-product coke plant at Chester. New coke ovens to be built by Koppers Co. will be completed by next spring, and will help meet the sharp increase in industrial gas demand resulting from accelerated defense materials manufacturing. Philadelphia Electric's charter procludes operation of the blast furnace by that company, but chances are favorable that it will be leased and placed in operation. It has been idle 11 years but could be restored to service in a relative short time.

April Tin Output Off; World Stocks Larger

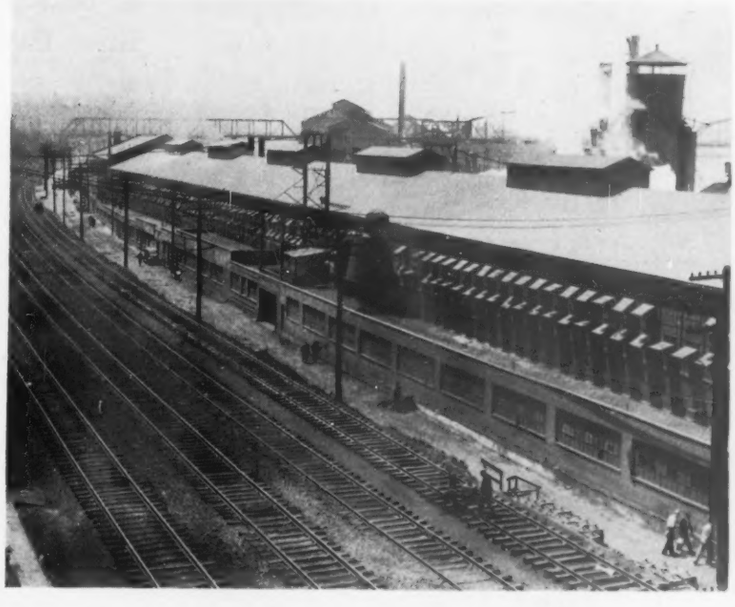
■ World production of tin in April is estimated at 17,100 gross tons, compared with 21,900 tons in March, according to the Tin Research Institute, Greenford, England. Production for four months totaled 73,800 tons, against 67,000 tons in the first four months, 1940.

United States deliveries totaled 13,955 tons in April, against 16,092 tons in March. For four months this year deliveries were 55,002 tons, and 33,479 tons in the corresponding period last year. Tin consumption in the United Kingdom in March was 2691 tons, compared with 2155 tons in February and 2347 tons in March, 1940.

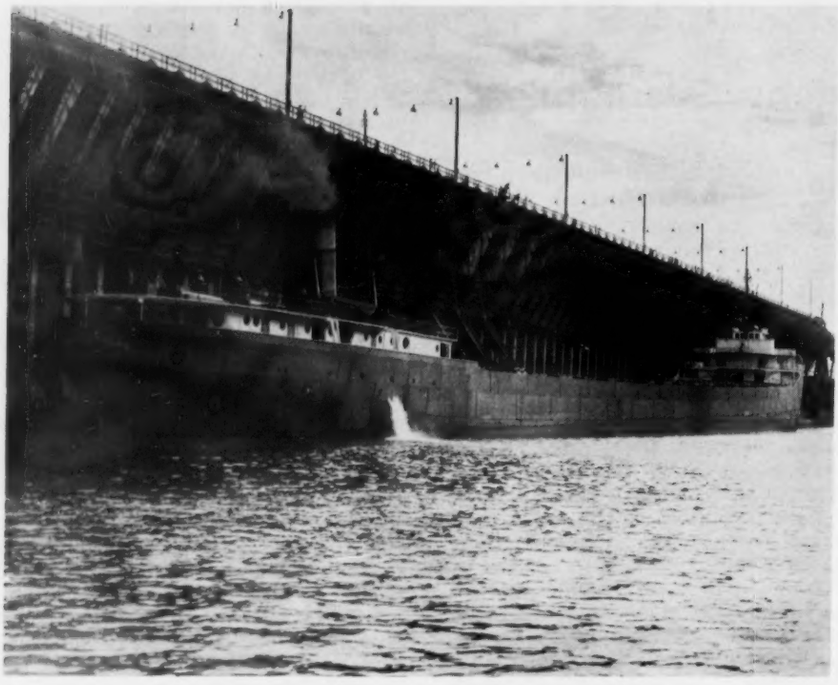




■ Above, Central Iron & Coal Co.'s blast furnace at Holt, Ala., purchased last week by Tennessee Coal, Iron & Railroad Co.; at right above, Warrior River Coke Co.'s coke plant to be rehabilitated and to supply coke to the Holt blast furnace



■ Firth-Sterling Steel Co., McKeesport, Pa., has completed modernization of its main mill building, shown at left. New sidewalls of brick, glass and steel were constructed to provide more working space, better light and improved ventilation



■ **WHERE MINING BECOMES MANUFACTURING: Chemists begin to blend and grade iron ores in upper lake docks—the reason for uniform quality, year after year, even while reserves diminish. Photo shows the HARRY COULBY at Superior**

11,007,439 Tons in 31 Days, All Alone; Canadians Now Reinforce Ore Fleet

■ SHIPMENTS of Lake Superior iron ore in May ran far ahead of early schedules—as did those in April—and if the present rate is sustained through summer and fall considerably more than the estimated 75,000,000 tons will be moved this season. The industry is beginning to show what it can do in an emergency.

A new monthly record—11,007,439 gross tons—in May brought the total to June 1 this year to 18,035,992 tons, more than double 7,743,196 tons in the comparable period last year.

The achievement of the mines, lake carriers, and the railroads last week won the approbation of high defense officials.

It was dramatized in a nation-wide broadcast sponsored by the National Association of Manufacturers, June 7, in its "Defense for America" series.

The latest on the ore movement is that it will equal or exceed 80,000,000 tons, studious efforts being made to insure an adequate supply in view of the pressure being brought by government to get up steel production.

The President signed the bill to permit bulk carriers of Canadian registry to carry iron ore to American ports. There are some 40 Canadian carriers, but from present indications only 20, averaging 9000 tons capacity, will be available for American trade, for four months of the season, to haul a total of 2,000,000 tons. This reinforcement of the 291 vessels of United States registry will manifest itself soon in new records, as the system is now in operation.

Grading Insures Uniformity

A remarkable feature in handling these huge tonnages of ore over great distances in smooth, efficient routine, is the uniformity of analyses of the cargoes arriving at lower lake ports.

Records of the Lake Superior Iron Ore Association, Cleveland, reveal how closely iron content of the ore is controlled. From 1910 to 1937 average iron content of ore shipped from all ranges has varied only from 52.16 per cent to 51.16 per cent. In 1940, average analysis of all ranges showed iron content of 52.09 per cent.

While ore as mined varies widely in iron and other contents, cargoes arriving at the furnaces have only a slight variation. It comes through as a high-grade, ready-to-use product, analysis guaranteed.

Ore is not merely gouged from the earth, dumped into cars, then into boats and conveyed to blast furnaces, there "to be melted down into iron" —as a Minnesota legislator once described it.

Carloads of ore moving from mines are like so many chemical units, their contents known and recorded; docks, as in the illustration, are not merely hoppers into which ore is poured, to be spouted into ships. They have far greater significance to the chemist, who utilizes them to mix, or "grade" the ores to conform to predetermined standards.

In the early days of ore mining grading consisted primarily of separating bessemer from nonbessemer ores. Only the rich ores were used.

The advent of special steels brought closer specifications and demand for uniformity. Silica, manganese and alumina became of increased importance. It became necessary to utilize ores of lower grade, and those whose analyses showed wide variations.

To obtain ore of desired analysis it was necessary to organize grading systems, simple, but requiring constant checking and supervision.

Loaded cars are sampled promptly on arrival at the mine yard. Analysis is relayed to the docks. If, for example, the shipment contains less iron than desired, it is assigned to a block which includes enough ore of higher iron content to bring the average to the desired analysis. Thus one dock pocket may contain four or five samples of ore, all varying in iron content. When the chutes are lowered and the ore runs into the cargo hold, the ore is mixed and the average analysis is very close to that desired. Further handling, of course, mixes the ore again.

E. & G. Brooke Iron Co. Buys Richard Ore Mine

■ The E. & G. Brooke Iron Co., Birdsboro, Pa., has purchased the Richard iron ore mine, two miles north of Dover, N. J., from the Thomas Iron Co., a subsidiary of the Philadelphia & Reading Coal & Iron Co.

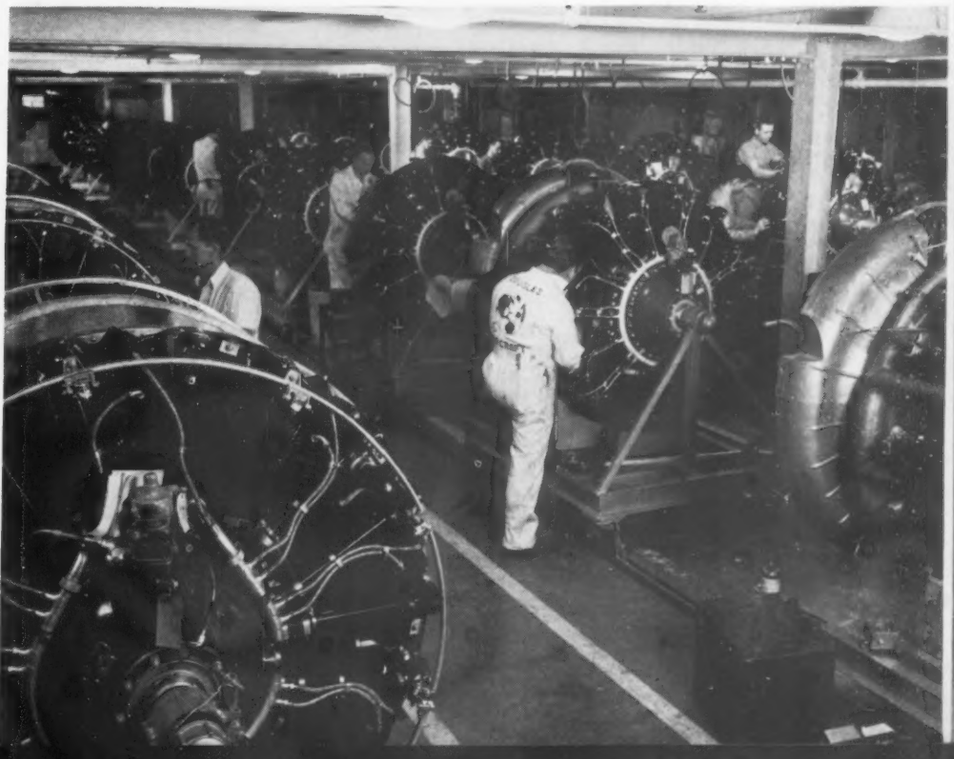
Purchase includes about 500 acres of land and all equipment, consisting of power plant, head frame and hoisting machinery, crushing and concentrating plant, office and dwelling houses.

A New Jersey corporation, called the Richard Ore Co., wholly owned by the E. & G. Brooke Iron Co., has been formed to take over and operate the mine, which is producing high grade magnetic concentrates for blast furnace use, and lump ore for open-hearth furnaces.

Bomber Output Trebled by Mass Production Line

■ Bomber fuselages roll on tracks and ball bearings and a regular time schedule, similar to the automotive production lines, at Douglas Aircraft Co.'s Santa Monica, Calif., plant. At each "position", workmen have an allotted time to perform their tasks. Since overhead conveyor systems, gravity-roll tracks and ball bearing speed were introduced some months ago, production has trebled, while working space was increased only 30 per cent and employment 70 per cent

■ Bomber wing center sections and motor nacelles move on an overhead conveyor, left. Parts and subassemblies flow into this moving line, like tributaries into a main stream, on elevated tracks



■ Half a million dollars worth of engines to power bombers for the United States and Great Britain are shown at right. Arriving partially dismantled at the Douglas plant, the engines must be readied for installation. Mounted on mobile stands, as shown, they roll on wheels down parallel tracks while skilled mechanics check complicated connections

America's No. 1 Question: Can Politicians Pull Us Through?

■ NEARLY two weeks have passed since the President delivered his important address of May 27. During that time the glamour of his words and of the dramatic occasion has been forgotten. Today the nation is scrutinizing the actions of the President and of his administration in an effort to judge from deeds the significance of what he voiced so eloquently.

• • •

At the time of the speech, the President's remarks were highly rated by a majority of the people. His talk was called a great state paper. He defined a national objective and he called upon all elements of society to unite to prepare the country for any contingency. To lend force to the call, he declared that a state of unlimited emergency exists.

To what extent have the actions of the President since May 27 supported the theme of his talk?

What has he done to impress the people with the sincerity of his call?

• • •

Two things stand out among the scores of official acts recorded since May 27.

One was the appointment of Harold L. Ickes as petroleum co-ordinator for national defense.

The other was the introduction in congress, by request of the war department, of a bill to empower the President to take over "either temporarily or permanently" private property "of any kind or character, whether real or personal, tangible or intangible," when the property "itself or through exercise of control can be used directly or indirectly in any way for national defense."

Do these acts tend to inspire confidence in the leadership of this nation? Do they serve to convince loyal citizens that at long last their government is ready to concentrate its attention and effort solely upon defense?

Unfortunately, no.

On the contrary, they revive the doubt and fear which were prevalent at the time of the court packing episode. They raise again the horror of a possible dictatorship. They arouse slumbering apprehensions as to many points.

For instance, Mr. Ickes has been made czar of the oil industry. He, an avowed enemy of business, is given one-man control over an important industry, whereas much abler men in OPM are given only scrambled authority.

Why is it that one-man authority is denied the vital OPM organization?

• • •

Again, in regard to the request for additional requisitional authority for the President, the reasons offered by apologists are too thin.

The plea that he needs it to combat strikes is balderdash. The President has failed to exercise any of the broad powers he already possesses to discourage strikes.

Unfortunately these two acts imply that the national leadership still is bent more upon political ambitions, experiment and punishment than upon the realities of effective defense.

What an opportunity for a President who could know that leadership through confidence is more potent than leadership through power!

E. C. Shaner

EDITOR-IN-CHIEF

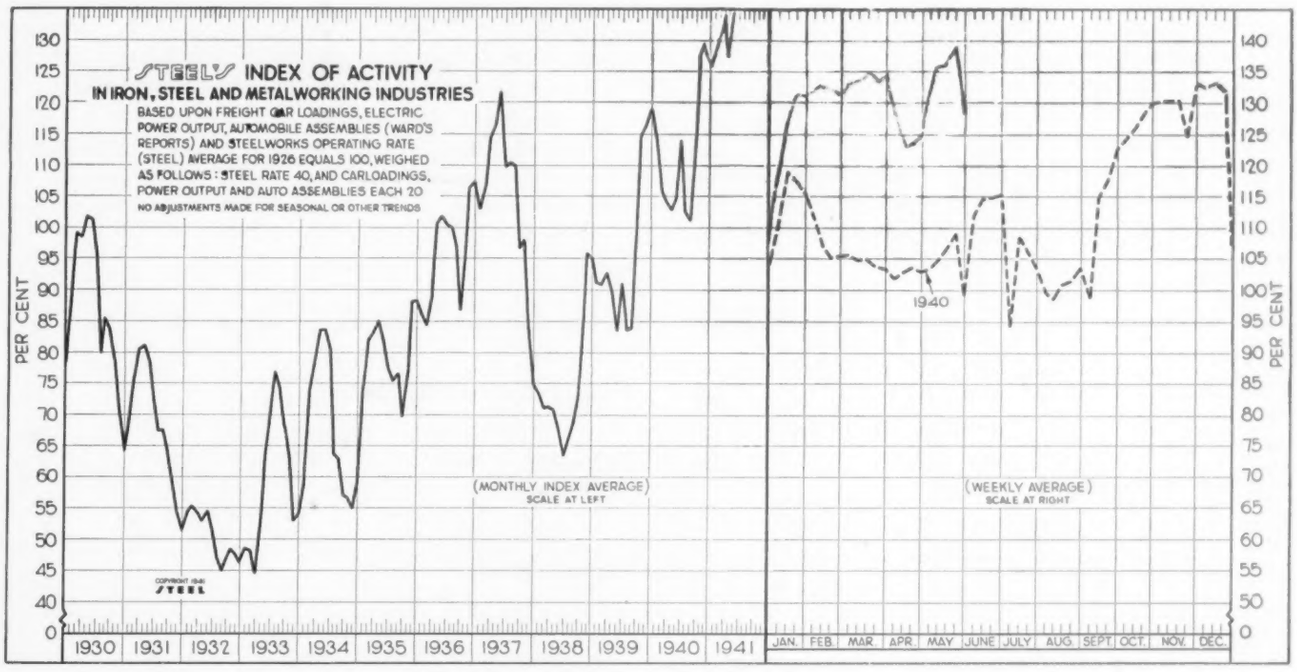
The *BUSINESS TREND*

Activity Index Reflects Holiday Interruption

■ REFLECTING the resumption of activity in the bituminous coal industry, pace of industrial production recorded a steady upward trend throughout May. During that period STEEL's weekly index averaged 134.8, a gain of 7.6 points over the 127.2 average for April. The monthly average registered by the index during May was the highest on record for any monthly period.

All of the industrial indicators composing STEEL'S index registered encouraging gains during May. In two instances new all time records were established, while the others reached the highest levels for the year to date.

Based on weekly figures, automobile production during May is estimated at 555,000 units. Output last month was the best monthly total of any month since 1929, and the second best May in history. The estimated total for May compares with 412,492 units in the same period last year, 540,377 in May, 1937, and was 636,250 in May, 1929. Outlook for June is for a sustained manufacturing pace at the current high level, although some very slight tapering may


STEEL INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL) AVERAGE FOR 1926 EQUALS 100, WEIGHED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS, POWER OUTPUT AND AUTO ASSEMBLIES EACH 20
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS
PER CENT
(MONTHLY INDEX AVERAGE) SCALE AT LEFT
(WEEKLY AVERAGE) SCALE AT RIGHT
1940
1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

STEEL'S index of activity declined 10.2 points to 128.4 in the week ended May 31:

Week Ended	1941	1940
March 22	133.5	103.7
March 29	133.9	103.2
April 5	128.9	101.8
April 12	123.8	102.7
April 19	124.2	103.4
April 26	126.5	102.8
May 3	132.6	103.3
May 10	135.9	104.8
May 17	136.1	106.8
May 24	138.6†	109.1
May 31	128.4	99.2

†Revised.

Mo. Data	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930
Jan.	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6
Feb.	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2
March	133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4	98.6
April	127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7
May	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2
June	....	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8
July	.....	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9
Aug.	.....	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4
Sept.	.....	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7
Oct.	.....	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8
Nov.	.....	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0
Dec.	.....	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3

begin to manifest itself. Schedules call for completion of about the same number of cars and trucks as occurred in May.

Steelmaking operations last month recovered sharply from the somewhat lower levels recorded during the latter part of April, resulting from the bituminous coal strike. Ingot production on a weekly tonnage basis reached the highest level in history. Only slight fluctuations in steelmaking operations are expected to occur over the coming months. The industry is operating at practical capacity and reports order backlogs sufficient to maintain this pace through the third quarter at least. Although new orders from nondefense consumers have eased moderately in recent weeks, the situation as to deliveries has not recorded much improvement. In view of the fact that allocation of tonnages on a number of products is becoming more general, it is believed in some quarters that steel producers would welcome priorities under the direction and supervision of governmental authority.

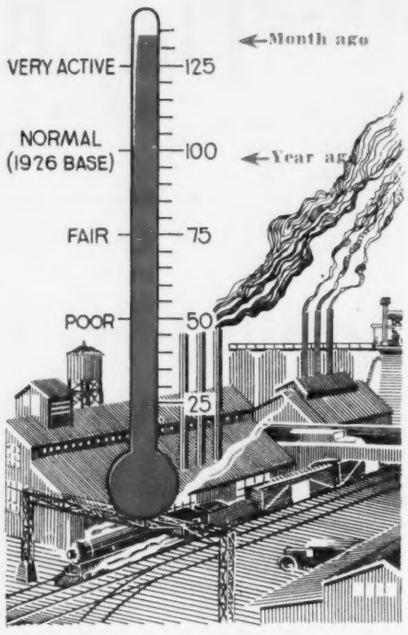
Revenue freight carloadings last month reached the highest weekly total recorded since the week ended Nov. 8, 1930. This sharp rise during May primarily reflected the efforts of numerous companies to build up depleted coal stocks. Railroad interests are anticipating a record-breaking movement of freight during the fall months of this year. In the past few months they have been placing orders for a large number of cars to meet this unprecedented demand.

Reflecting the observance of Memorial Day, STEEL's index of activity declined 10.2 points to 128.4 during the week ended May 31. In the comparable period of 1940, 1937 and 1929 the index receded 9.9 points, 10.5 points and 9.2 points respectively. A sharp rebound to the pre-holiday week level is indicated for the period ended June 7.

Where Business Stands

Monthly Averages, 1940 = 100

	April, 1941	March, 1941	April, 1940
Steel Ingot Output	122.9	125.9	94.2
Pig Iron Output	113.0	118.4	108.2
Building Construction	121.8	143.8	101.6
Auto Output	125.3	136.5	145.5
Freight Movement	102.6	109.5	97.6
Wholesale Prices	106.0	103.8	101.9



The Barometer of Business

Industrial Indicators

	April, 1941	March, 1941	April, 1940
Pig iron output (daily average, tons)	144,723	151,707	140,635
Iron and steel scrap consumption (gross tons)	4,406,000	4,662,000	2,548,000
Gear Sales Index	292	288	128
Foundry equipment new order index (1937-39=100)	377.2	315.2	145.2
Finished steel shipments (Net tons)	1,687,674	1,720,366	907,904
Ingot output (average weekly; net tons)	1,575,228	1,609,851	955,821
Dodge bldg. awards in 37 states ($ Valuation)	$406,675,000	$479,963,000	$300,504,000
Automobile output	489,841	533,912	452,433
Business failures; number	1,149	1,211	1,291
Business failures; liabilities	$13,827,000	$13,444,000	$16,247,000
Cement production, bbls.	12,196,000	10,600,000	10,043,000
Cotton consumption, bales	920,142	854,179	623,098
Car loadings (weekly ave.)	717,573	765,596	639,296

Commodity Prices

	April, 1941	March, 1941	April, 1940
STEEL's composite average of 25 iron and steel prices	$38.15	$38.27	$36.69
U. S. Bureau of Labor index	83.2	81.5	78.6
Wheat, cash (bushel)	$0.928	$0.95	$1.118
Corn, cash (bushel)	$0.745	$0.755	$0.755

Financial Indicators

	April, 1941	March, 1941	April, 1940
30 Industrial Stocks†	$119.10	$122.52	$148.91
20 Rail stocks†	$28.48	$28.03	$31.00
15 Utilities†	$18.66	$19.56	$25.09
Commercial paper rate, (N. Y., per cent)	½–⅝	½–⅝	½–⅝
*Com'l. loans (000 omitted)	$9,870,000	$9,828,000	$8,661,000
Federal Reserve ratio (per cent)	91.3	91.2	88.0
Capital flotations : (000 omitted)			
New Capital	$746,178	$181,711	$116,887
Refunding	$175,738	$224,892	$227,987
Federal Gross debt, (millions of dollars)	$47,231	$47,173	$42,663
Railroad earnings‡	$80,627,172	$58,478,869	$37,034,270
Stock sales, New York stock exchange	11,185,760	10,124,024	26,696,490
Bond sales, par value ($1,000,000)	$209.5	$214.9	$165.4

‡March, February and March respectively.
*Leading member banks Federal Reserve System.
†Dow-Jones Series.

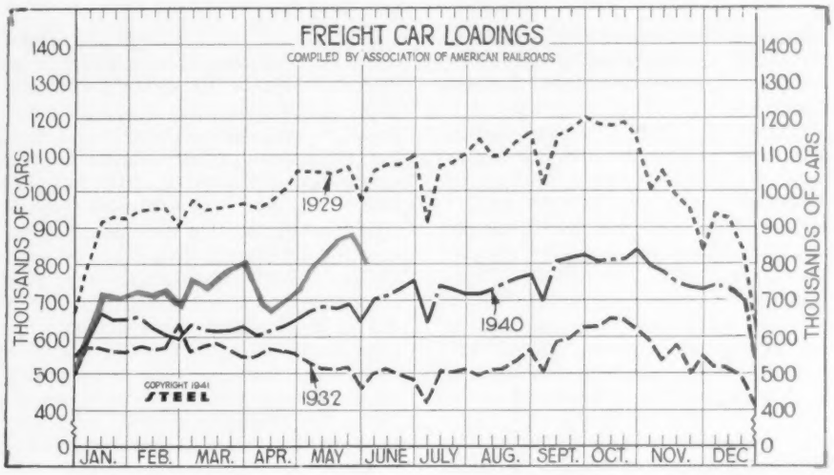
Foreign Trade

	March, 1941	Feb., 1941	March, 1940
Exports	$357,565,000	$303,413,000	$352,272,000
Imports	$267,784,000	$233,702,000	$216,732,000
Gold exports	$3,000	$6,000	$18,000
Gold imports	$118,569,000	$108,615,000	$459,845,000

Steel Ingot Operations

(Per Cent)

Week ended	1941	1940	1939	1938
May 31....	99.0	78.5	52.0	25.5
May 24 ...	100.0	75.0	48.0	28.5
May 17....	99.5	70.0	45.5	30.0
May 10....	97.5	66.5	47.0	30.0
May 3	95.0	63.5	49.0	31.0
April 26...	96.0	61.5	49.0	32.0
April 19 ..	98.0	61.5	50.5	32.5
April 12...	98.0	61.0	51.5	32.0
April 5 ..	98.0	61.5	53.5	32.0
March 29 ..	99.5	61.0	54.5	36.0
March 22 ..	99.5	62.5	55.5	35.0
March 15 ..	98.5	62.5	56.5	32.0
March 8...	97.5	63.5	56.5	30.0
March 1...	96.5	65.5	56.0	29.5
Feb. 22 ...	94.5	67.0	55.0	30.5



Freight Car Loadings

(1000 Cars)

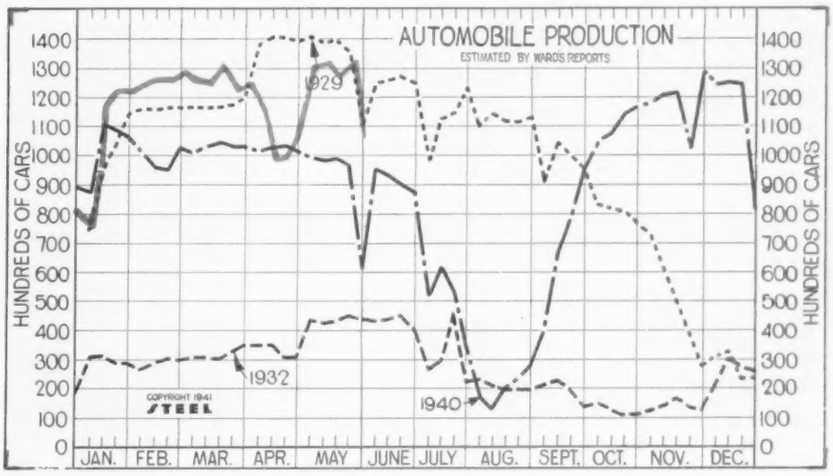
Week ended	1941	1940	1939	1938
May 31	802	639	568	503
May 24.....	866†	687	628	562
May 17.....	864	679	616	546
May 10	837	681	555	542
May 3	794	666	573	536
April 26.....	722	645	586	543
April 19.....	698	628	559	524
April 12	680	619	548	538
April 5.....	682	603	535	522
March 29 ...	792	628	604	523
March 22...	769	619	605	573
March 15 ...	759	619	595	540
March 8.....	742	620	592	557
March 1.....	757	634	599	553
Feb. 22.....	678	595	561	512

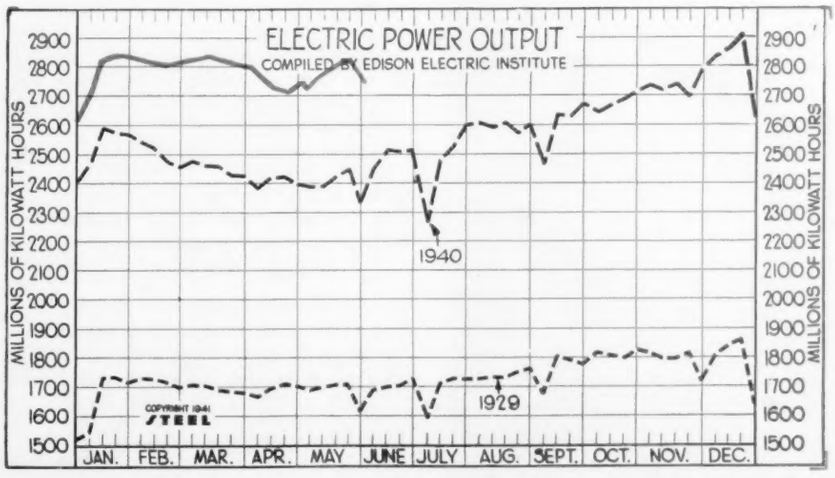
†Revised.

Auto Production

(1000 Units)

Week ended	1941	1940	1939	1938
May 31....	106.4	61.3	32.4	27.0
May 24....	133.6	96.8	67.7	45.1
May 17....	127.3	99.0	80.1	46.8
May 10....	132.6	98.5	72.4	47.4
May 3	130.6	99.3	71.4	53.4
April 26...	108.2	101.4	86.6	50.8
April 19 ..	99.9	103.7	90.3	60.6
April 12...	99.3	101.9	88.1	62.0
April 5 ...	116.3	101.7	87.0	61.0
March 29..	124.2	103.4	86.0	57.5
March 22..	123.8	103.4	89.4	56.8
March 15 ..	131.6	105.7	86.7	57.6
March 8 ..	125.9	103.6	84.1	57.4
March 1...	126.6	100.9	78.7	54.4
Feb. 22....	129.2	102.7	75.7	57.0




ELECTRIC POWER OUTPUT
COMPILED BY EDISON ELECTRIC INSTITUTE
MILLIONS OF KILOWATT HOURS
1940
1929
COPYRIGHT 1941 STEEL
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

Electric Power Output

(Million KWH)

Week ended	1941	1940	1939	1938
May 31 ..	2,730	2,332	2,114	1,879
May 24...	2,838	2,449	2,205	1,973
May 17...	2,800	2,422	2,170	1,968
May 10...	2,792	2,388	2,171	1,968
May 3 ..	2,734	2,386	2,164	1,939
April 26..	2,750	2,398	2,183	1,939
April 19..	2,702	2,422	2,199	1,951
April 12..	2,721	2,418	2,171	1,958
April 5 .	2,779	2,381	2,174	1,990
March 29.	2,802	2,422	2,210	1,979
March 22.	2,809	2,424	2,199	1,975
March 15 .	2,818	2,460	2,225	2,018
March 8..	2,835	2,464	2,238	2,015
March 1..	2,826	2,479	2,244	2,036
Feb. 22...	2,820	2,455	2,226	2,031

SHAPING METAL S

for aircraft

■ IN SPITE of the great strides which have been made in aircraft production methods, the manufacturer of airplanes today, especially fighting aircraft, is on a basis somewhere between the original hand methods and the straight-line high-speed mass-production systems employed in the automotive industry.

Even today there are few instances where duplicate parts for airplane bodies are made in quantities of more than 25, and many, many sections go through in lots of 10 or less. What has been done to speed up production of sheet metal parts in quantities of this order is exemplified exceptionally well by practice at Curtiss-Wright Corp.'s Buffalo plant.

About 95 per cent of Alclad sheets used here is for the navy. Dural and the other 5 per cent of the Alclad go to make army planes. Other stock includes 3S half-hard aluminum for welded tanks, and of course many other metal classifications.

To prevent scratching the sheet surfaces during cutting and forming operations, many sheets are given a lacquer coating. To others, an oil preparation is applied.

Fig. 1—One of two 14-foot press brakes utilized for rapid preparation of straight edges

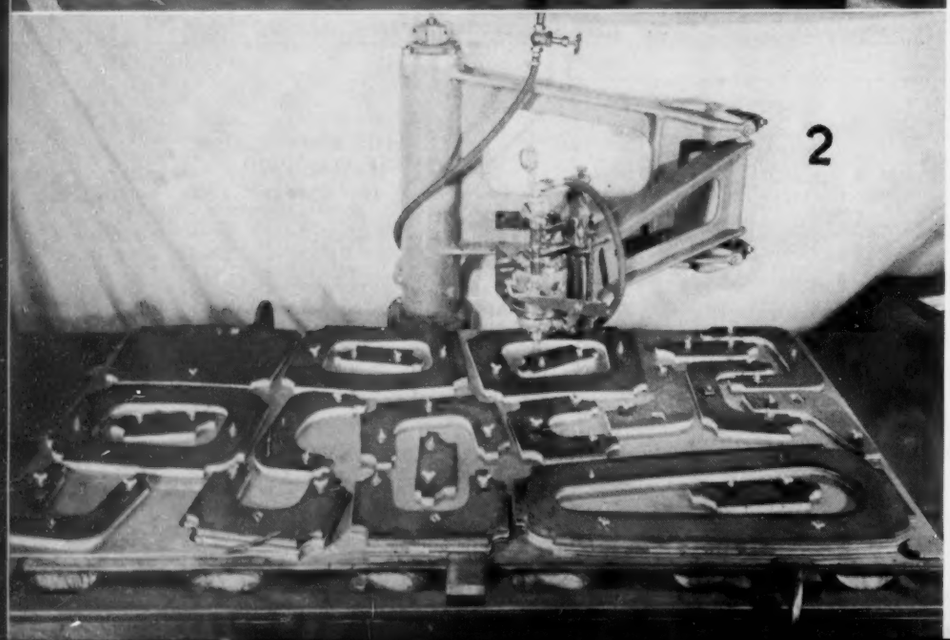


Fig. 2—View of work laid out for routing. Note how odd shapes are placed so as to produce most efficient utilization of the material. Wing nuts speed clamping into position

One of the most important problems is how to cut out the many irregular shapes involved. Cutting rectangular shapes is a simple matter, this work being done on a number of press brakes. Available for cutting straight edges are two 14-foot Cincinnati press brakes, one 6-foot heavy-duty press brake and another 6-foot light-duty brake. One of the 14-foot units is shown in Fig. 1. These are all equipped with hold-down devices and other modern accessories. For instance, in Fig. 1 note the roller-top table at the right to facilitate moving piles of sheet. Note the table is divided into sections, each about 2 feet wide and provided with three rollers of rather large diameter.

Cutting irregular outlines is done largely on a line of routing machines. One of the five units employed is shown in Fig. 2. All five routers are in line on a common table.

As shown in Fig. 2, templets are arranged to afford minimum waste of metal. These templets consist of plywood forms, the top surface of which is covered with a steel plate about ⅛-inch thick. Each plywood templet is in two separate pieces, each about ½-inch thick. Lower plywood pieces are placed below the group of 10 or 12 sheets to be cut out simultaneously and are fastened to the common baseboard. The other section of the plywood templet and the steel top are placed above the sheets, the two portions of the templet and the sheet then being locked together by bolts through drilled holes in the sheets. Wing nuts are provided for tightening up the assembly quickly.

Thus, as prepared for the routing

SHEET

Modern aircraft production involves a tremendous problem in producing most efficiently a great variety of sheet metal parts of odd shapes, often in small lots, and then of punching and forming these parts for use. Here are presented some of the high points of practice at Curtiss-Wright's Buffalo plant and methods developed to keep die costs commensurate with volume of work the dies are to produce

By **OTTO OETINGER**, Superintendent, Forming Department
Curtiss Aeroplane Division, Curtiss-Wright Corp., Buffalo

operation, the 10 or 12 sheets to be cut are clamped between templet sections, the entire assembly being on a common plywood baseboard, the same size as sheets being cut. The baseboard then is clamped in place on the routing table and actual routing done. As is well known, the router consists of a rotary cutting tool, in this case driven by an air motor at high speed. The shoulder of the cutting tool rides against the steel templets, which thus act as an accurate guide in cutting. The portion of the templet below the sheet prevents the cutting tool from cutting into the baseboard. With a high-speed cutter and templets bolted in place, routing proceeds very fast.

In Fig. 2 some routing has already been done at the very front of the templets as the line of cut can be seen extending from the right front across the first three templets, at which point the work was interrupted to take the photograph. The router also was swung back toward the rear of the templets to show all the templets on the table.

To finish off or trim the surface of the edges just cut in the router, the work may proceed to a shaper, one of which is shown in Fig. 3. Here a high-speed cutter extends up through the table top. In operation, the sheet stack clamped between templets is simply moved against the cutter. The top and bottom portions of the templet contact shoulders on the cutter head, limiting the amount of cut to the exact dimensions of the templet. Work removed from the templet is found trimmed to size with edges smooth and uniform.

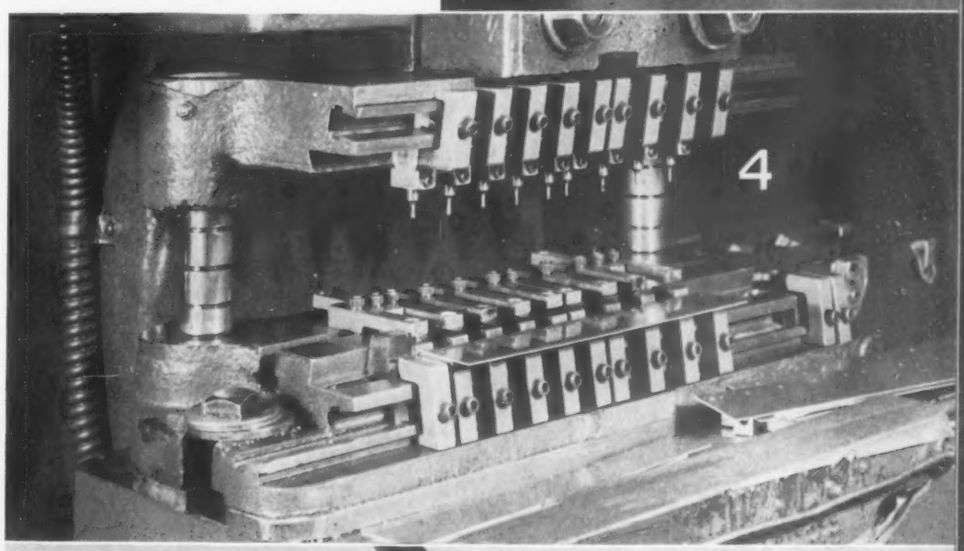
Next step is to punch or drill holes for rivets. Many parts having a large number of holes in line are handled on gang perforating die setups such as that shown in Fig. 4. As can be seen here, the punches and dies are movable along the line so holes can be punched in any combination as long as centers are ½-inch or more apart.

In addition to the gang punch shown in Fig. 4, many others are available, including a new unit with punches and dies arranged to handle work up to 6 feet long. As many as 65 holes can be punched simultaneously on distances as close as ½-inch centers.

As shown in Fig. 5, the punches and dies vary widely. Some also countersink as well as punch the hole. These are used where the rivets must be countersunk to have heads flush with outside surfaces of the aircraft—a consideration essential for minimum air resistance.

Many, many holes are drilled as it is not economical to punch all

(*Please turn to Page* 95)



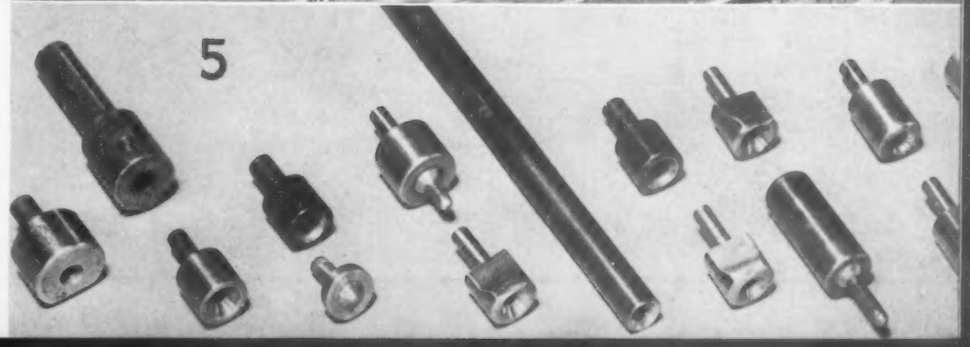


Fig. 3—Stack of parts clamped between wooden templets is trimmed to exact size quickly on this shaper. The only part projecting above the table top is the cutter shown. Shoulder on cutter is flush with cutter teeth, thus limiting depth of cut to edge of templet, producing exact shape required

Fig. 4—Gang punch setup. Note punches and dies are movable to permit punching any combination of holes on centers ½-inch or over

Fig. 5—Typical group of perforating punches and dies

SHELL and BOMB FUZES

Part II

Can a clock be used as time element in a fuze? Read how centrifugal force is used for driving; how escapement works; setting and firing; devices to prevent premature ignition; effect of centrifugal forces; analysis of recent German fuze patents; the rotor safety element; fuzes for airplane bombs

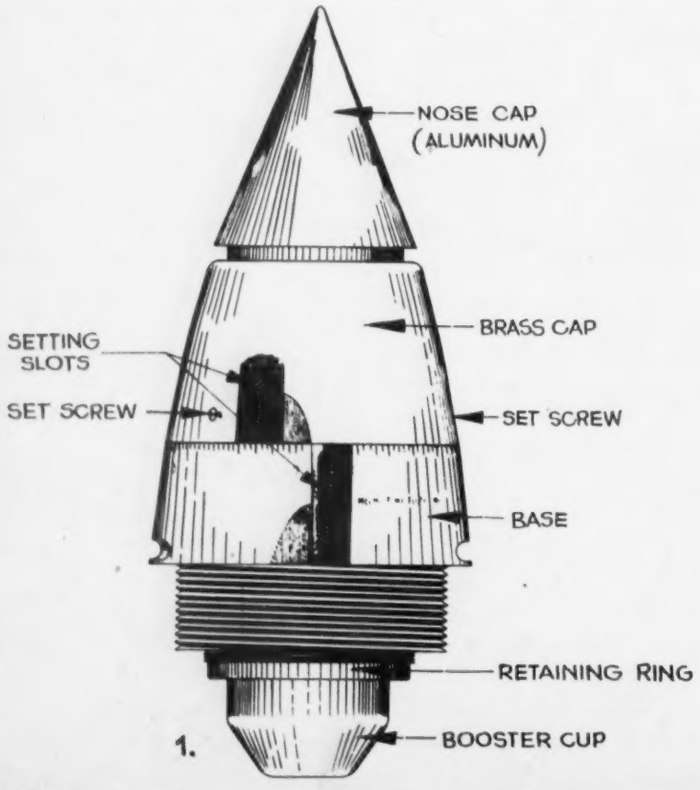
(This Is Number 18 in a Series on Ordnance and Its Production, Prepared for STEEL by Professor Macconochie)

By ARTHUR F. MACCONOCHIE
Head, Department of Mechanical Engineering
University of Virginia
University Station, Va.

■ WHILE the mechanical fuze is regarded as a recent development, actually the first mechanical fuze dates back to 1860. It consisted of an inclined tube containing shot which were supposed to run out of a variable orifice under the action of centrifugal force. This was virtually an hour glass, the principle having the merit of extreme simplicity. Unfortunately, neither this early effort nor any subsequent attempt along similar lines has ever worked well enough to merit adoption.

With all due respect to the originators of those devices of the mechanical type which function with sufficient accuracy and reliability to hold their place in favor, the clock design of fuze is neither simple nor inexpensive to construct, the first impression upon the layman being one of awe and amazement that so much mechanical complication should enter into the construction of a piece doomed to a sudden and violent end.

As early as 1914, the possibilities of the mechanical fuze were being investigated here, a number of the Krupp type being purchased for purpose of experiment. The results of these tests were encouraging, so attempts were made to develop domestic production of a satisfactory design. These efforts met with little or no success, so attention was directed to a mechanical fuze patented by Oskar Junghans, Schramberg, Germany. After some preliminary tests, the rights to manufacture were purchased and a period of experimental work supervened, production equipment and engineering personnel familiar with the nature of the problem of manufacturing this fuze having also been secured. The external appearance of this, the M2 fuze as it had been developed up to some 8 or 10 years ago is shown in Fig. 1, reproduced here from an excellent article by Capt. Bryan



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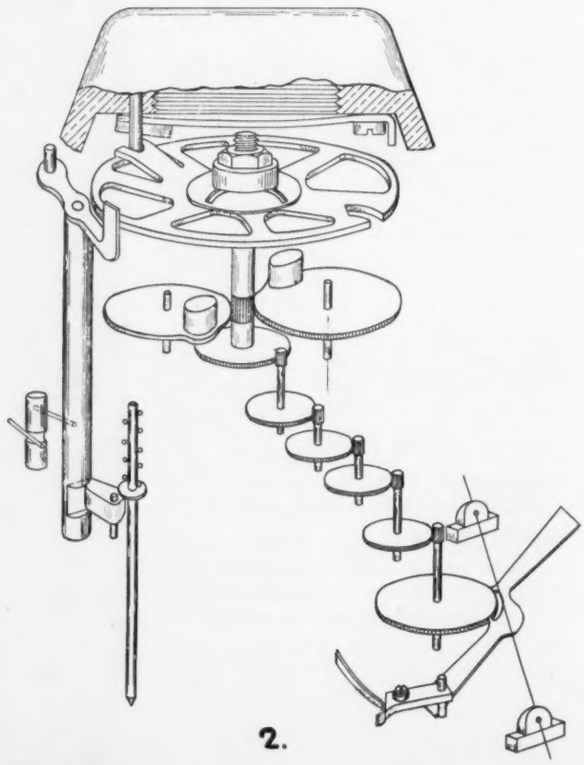
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L. Milburn C.A.C., in the *Coast Artillery Journal* for July-August, 1933.

The aluminum nose cap is empty, being merely added for ballistic reasons. The fuze mechanism contained in the brass cap and in the base of the M2 fuze is exhibited in developed form in Fig. 2 and in its assembled form in Fig. 3. Referring to Fig. 2 for a moment, we note that the motive power is obtained from two centrifugal weights mounted on gears meshing with the main shaft. A detail of this arrangement is shown in Fig. 4.

According to a suggestion offered in a very comprehensive article on "Mechanical Time Fuzes" by Col. John G. Booton in *Army Ordnance* for March-April, 1937, the speed of the escapement is not affected by variations in the power applied to it. However, a study of the Junghans patents reveals considerable effort to maintain uniform torque. Consider, for instance, Patent No. 2,190,157 granted to Helmut Junghans Feb. 13, 1940. In Fig. 5 we observe that in the early stages of the action when masses "b" are close to the axis of rotation, the torque upon the central spindle is increased by the moments of masses "d" about the pivots "a". As the action proceeds, however, and the centrifugal forces acting upon masses "b" increase, matters are so arranged that the centrifugal moments of masses "d" about the pivots "a" diminish and finally disappear as these masses become aligned along the radius. Such an arrangement obviates the necessity of using springs such as appear in the arrangement shown in Fig. 4.

In the M2 fuze escapement, a straight hairspring is used. This must obviously be so disposed as to avoid bending stresses and should be stretched across the center of rotation of the fuze. The actual arrangement of the escapement is best seen at lower right in Fig. 2, the two adjusting blocks used to vary the period of the escapement being shown at the ends of the hairspring. Lest the impression be given that this system operates after the fashion of a watch escapement, let it be emphasized that the small weight of the vibrating pallet together with the strength of the hairspring constitute what amounts to a mechanically sustained tuning fork.

The centrally located hair spring of course is exposed to centrifugal forces acting in an axial direction, tending to stretch the spring. This appears to have the effect of stiffening it and shortening the period of vibration of the escapement. The error introduced in this way is about 3 1/3 per cent. In other words, the clockwork slows down by about this amount when the fuze is not rotating at all as compared with its performance when rotating at 16,000 revolutions per minute. Attempts made to correct this error appear to have met with no success. This is not serious, however, as an allowance is simply made for it in setting the fuze.

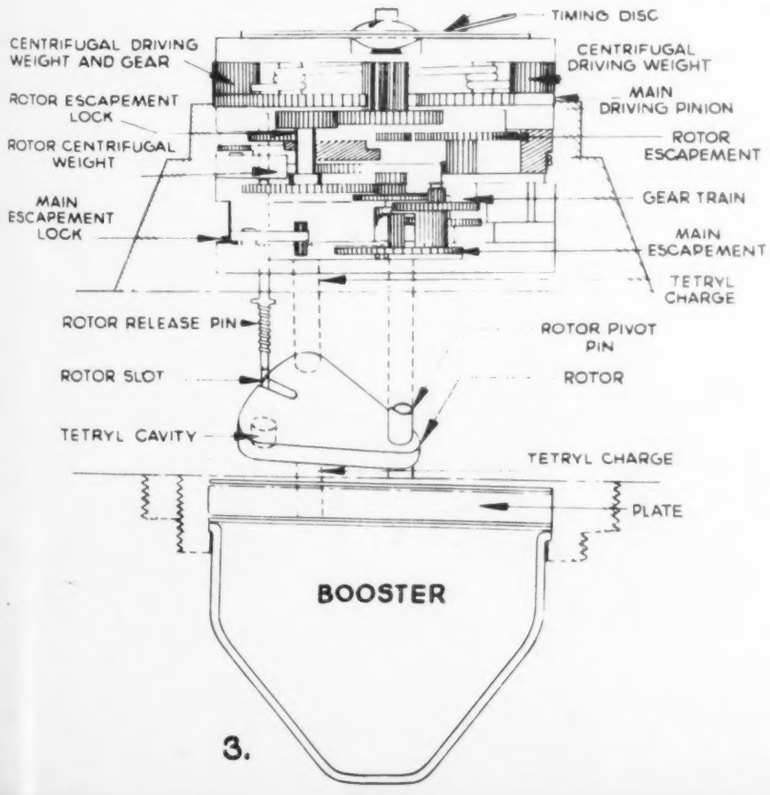
How It Is Set: From Figs. 2 and 3, we note the clock mechanism drives a timing disk at the upper end of the main spindle on which the drive gears operate. This timing disk is free to rotate on the main spindle against the resistance of a friction grip. Thus, by rotating the brass cap in relation to the base, the pin in the cap changes the angular relation of the timing disk to the main spindle via the raised fork in the timing disk with which the pin engages.

Fig. 1—External parts of M2 mechanical fuze, one of the first successful designs of this type

Fig. 2—Mechanism of mechanical fuze, Fig. 1, shown in developed form for simplicity

Fig. 3—M2 mechanical fuze clockwork and rotor safety device as assembled

Fig. 4—Detail of centrifugal weights which furnish driving force, aided by the springs which help to maintain uniformity of driving torque



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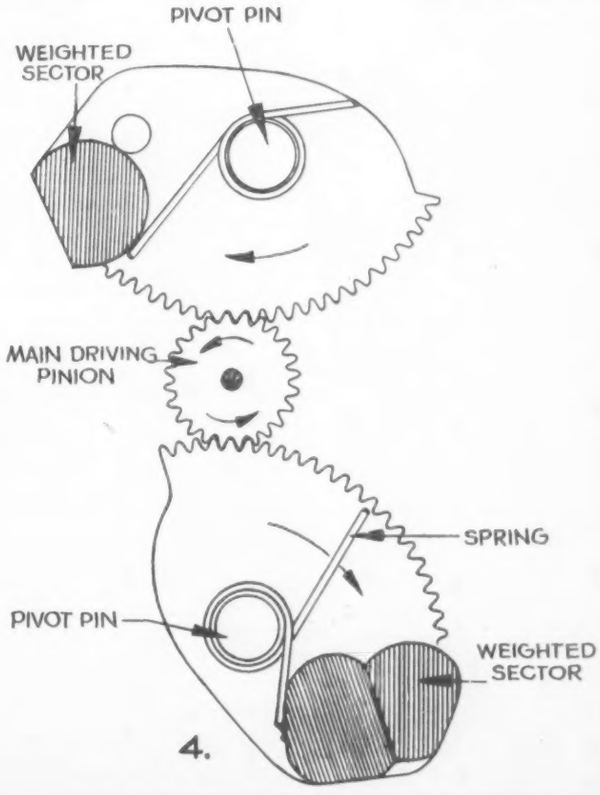

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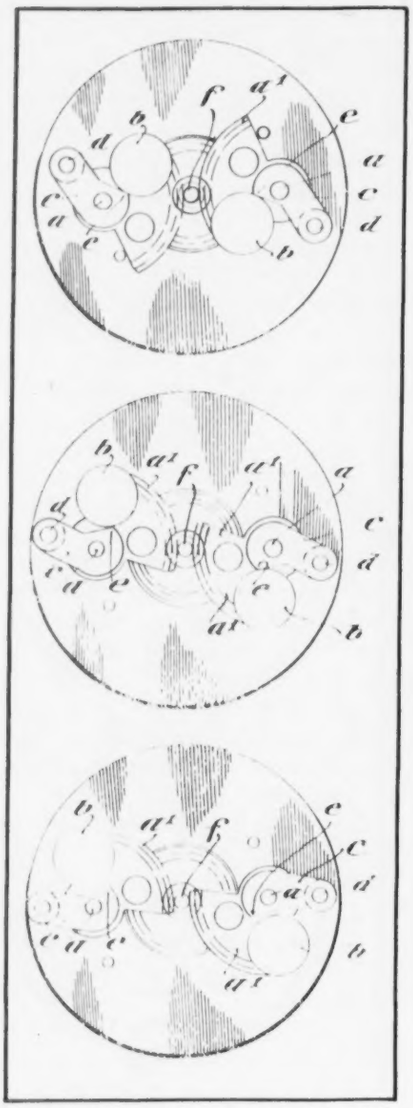

Fig. 5—Device, above, patented in 1940 to provide uniform driving torque

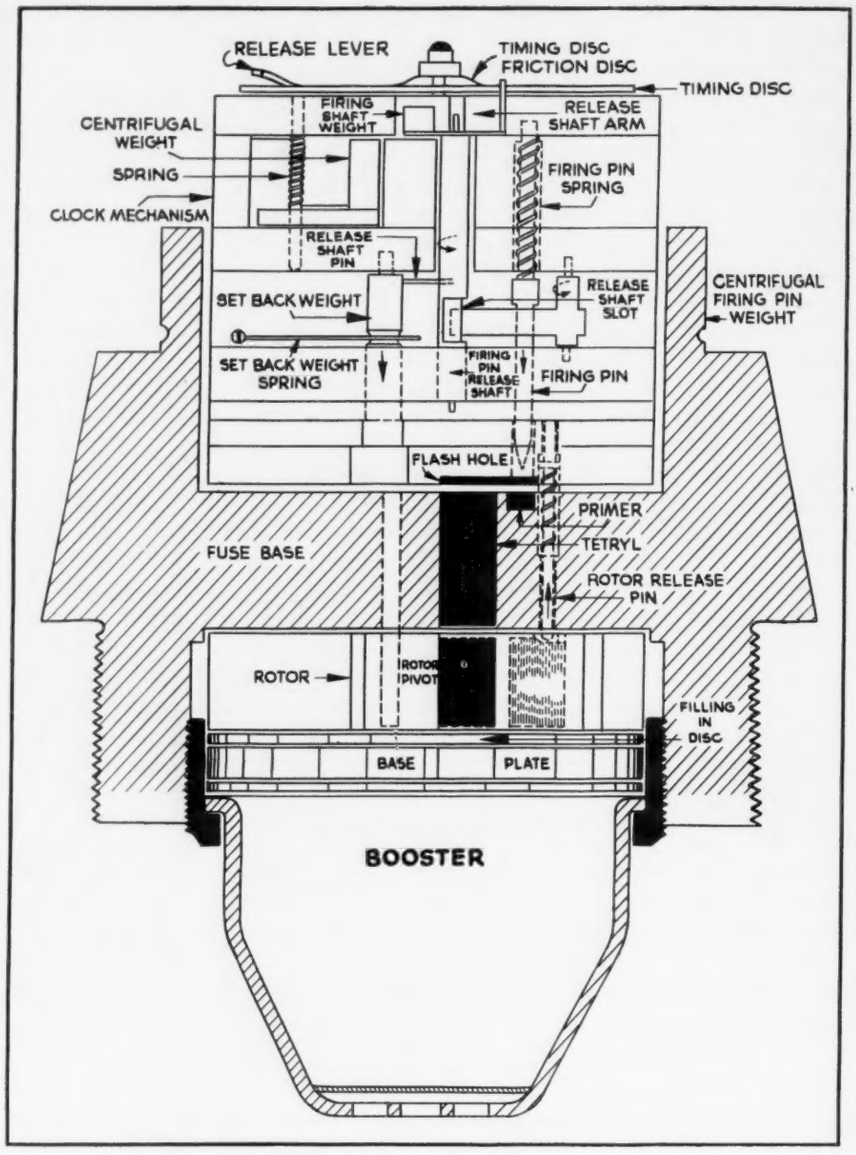

Fig. 6—Side view of firing mechanism, right, of M2 fuze, showing operating elements

In this way the fuze is "set" for any desired interval.

How It Detonates the Charge: As the disk rotates (counter-clockwise when viewed from above in Fig. 2), the slot in the periphery finally arrives opposite the light arm held in place against the disk by centrifugal force acting on the tail of the arm. The dropping of the arm into the slot in the timing disk permits the release shaft, extreme left in Fig. 2, to rotate through a small angle, thus bringing the milled slot near its lower extremity into such a position that the arm of the centrifugal firing pin weight (as also indicated in Fig. 6) is free to pass by the release shaft and so permit the firing pin, driven by a coil spring on its shaft, to snap down on the primer, thus detonating the charge.

Fig. 7 shows a plan view of the timing disk with its raised release fork. At the instant of firing, the twin hammers, normally held up by the release spring, smack the fork down flat and so release the timing disk from the setting pin. This starts the action. Until these hammers come into play, the timing disk cannot revolve at the instance of the clock. We are, however, by no means ready to fire until certain other events have taken place.

Safety Devices: If Fig. 6 be examined carefully, a device labeled "set-back weight" will be discovered. This is a small steel cylinder having a V-shaped recess near its middle and working in the hole provided. The "set-back weight spring" is a small curved cantilever spring, having its blade tilted to permit the set-back weight to pass when the shell is struck by the explosion of the propelling charge in the gun. Fig. 6 does not show this very clearly and the fuze has actually to be handled to appreciate the action completely. Close beside the set-back weight and to the right may be seen a small pin, set in the release shaft and resting behind the set-back weight. Before the release shaft can rotate, this pin must be freed from the set-back weight, and this can only happen when the weight is forced backward into the socket provided by inertia as the shell starts its flight.

It might be imagined that these safety devices would suffice. Still we are not content. There is always the possibility of collapse of the mechanism accompanied by the premature release of the firing pin. One wonders, indeed, how the clockwork stands the treatment it receives until a closer acquaintance reveals the compact and sturdy nature of the design. Spindles are strut-like, resting with their shoulders against the supporting plates.

Slender parts (e. g. the timing disk) are offered support during set-back; and gear trains are held as close to the center of rotation as

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possible to minimize friction on the pivots. This M2 fuze will still function when spun up to 40,000 revolutions per minute in a testing machine.

It did give trouble, however, when fired from rifles having one twist in 25 calibers, or when violently accelerated and spun up to 26,000 revolutions per minute at one and the same time.

Terrific Centrifugal Forces: The direction in which progress has been made since the M2 was redesigned as the M43 fuze has been toward considerable strengthening of some of the parts to meet the higher stresses occasioned by higher rotational speeds. The nature of this problem can best be appreciated after making a simple calculation of the magnitude of the centrifugal force acting on the several parts of the fuze at even a short distance from the axis. When spinning at 16,000 revolutions per minute, for instance, the centrifugal force per pound of mass at radius of 1 inch is **3.65 TONS!!** Since this force is proportional to the square of the angular velocity of rotation, the necessity for strengthening the parts and for other modifications at still higher rotational speeds will be apparent.

Other changes made include a reduction in the weight of the entire assembly by the use of an aluminum base.

Also, the device marked "rotor" in Fig. 3—an arrangement intended to insure detonator safety—has been eliminated, following the development of a booster common to all types of fuzes. The manner in which this detonator safety device worked can best be understood by reference to Figs. 3 and 6 and also to Fig. 8. The rotor proper is so designed that it tends to rotate under the action of centrifugal force from the "unarmed" position in which it is first established to the "armed" position in which the tetryl pellet which it carries is aligned with the tetryl charges in the base of the fuze and in the base plate, as shown in Fig. 6. Before this can happen, however, the weight-driven segment, best seen in the schematic layout of Fig. 8, has to move outward under escapement control until it uncovers the rotor release pin, which is thus free to rise under the action of a spring until it clears the slot in the rotor, see Fig. 3. This rotor then is free to revolve.

Since the duration of the period during which this safety device has to operate is of no great consequence, provided it makes detonation of the bursting charge impossible until the shell is several hundred feet from the gun, the vibrating part of this escapement merely operates under the action of centrifugal force exactly after the fashion of a compound pendulum under gravitational acceleration. The important difference, of course, is that whereas the accelerating force from gravity remains constant for any given situation on the earth's surface, the acceleration due to the centrifugal force from rotation is a function of the angular velocity of the shell—a quantity subject to considerable variation and thus not adapted to the accurate measurement of time.

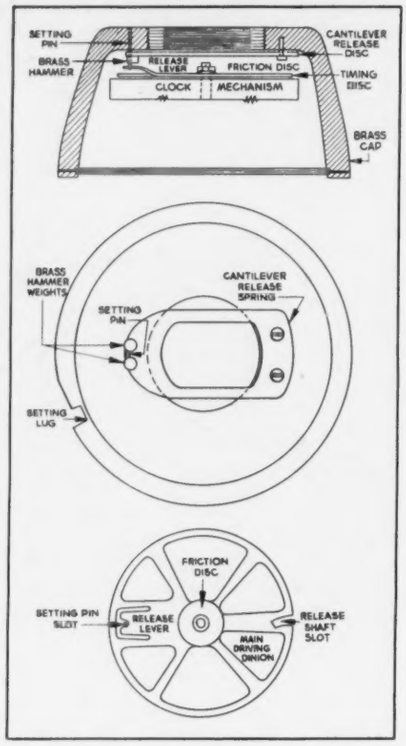
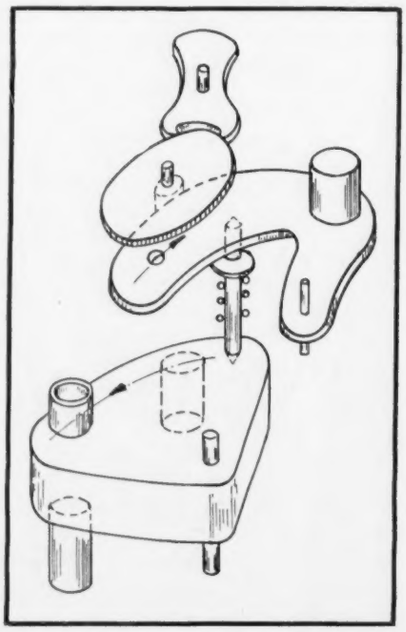


Fig. 7—Top shows side or sectional view of brass cap, cantilever release spring, and timing disk and their relation in the fuze. Center is plan or front inside view of brass cap; bottom front view of timing disk—all of M2 fuze

Fig. 8—Schematic layout of weight-driven safety device



Eliminates Firing-Pin Springs: A study of recent patents of German origin relating to mechanical fuzes and more especially those of Oskar Junghans (deceased) and Helmut Junghans of Schramberg and Schramberg-Sulgen indicates an interest, among other things, in the substitution of devices operating by centrifugal force rather than by springs. Patent No. 1,927,746 granted to Helmut Junghans on Sept. 19, 1933, relates to the substitution of a centrifugally operated striker pin in place of one driven by a strong spring on the ground that such springs must be kept in a stressed condition during storage, and hence are liable to deterioration or even fracture. While we in this country have not thought the necessity sufficient to warrant this further complication, the Junghans Co. has applied this principle in their recent designs. In Fig. 9 from the Junghans patent, observe that the detonating cap is accommodated in a radially movable slide which is locked in position by the pawl "h" until the time for action arrives.

The Action in Brief

Briefly the action is as follows: On firing, the set-back element "l" (ell) moves backward (downward as seen in Fig. 9) as previously described, thus releasing the pin "k²" and permitting the arm "k'" to engage the slot in the periphery of the timing disk after the lapse of the interval for which the fuze is set. On rotation of the release shaft "k", the lever arm "i'" flies outward under the action of centrifugal force, thus causing shaft "i" to rotate. As seen in Fig. 10, observe that rotation of shaft "i" frees the pawl "h" for action by the slide "g" carrying the cap "f" against the striker pin "n".

To prevent movement of the slide "g" by any means before the shell has left the gun, there is provided a cam "o'" driven through shaft "o" by the clockwork of the fuze which will not release the slide until after the lapse of a predetermined interval measured from the instant of firing. Presumably from the shape of this cam, Fig. 10, the fuze will only function during a certain interval. Nothing can happen until the cam face parallels the slide; and no action can take place after the cam has once more closed off the possibility of movement of the slide.

Another development of some interest among the list of Junghans patents is the use of a guard to

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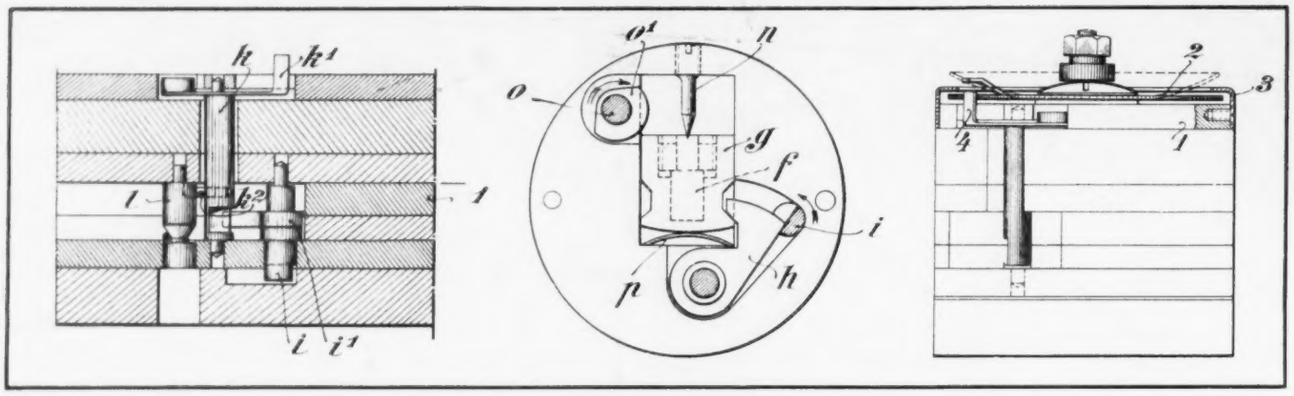


Fig. 9—This is section through device to drive striker or firing pin by means of centrifugal force instead of springs

Fig. 10—Plan view of centrifugal striker device shown in Fig. 9

Fig. 11—Here a guard prevents buckling of the timing disk, another interesting fuze patent

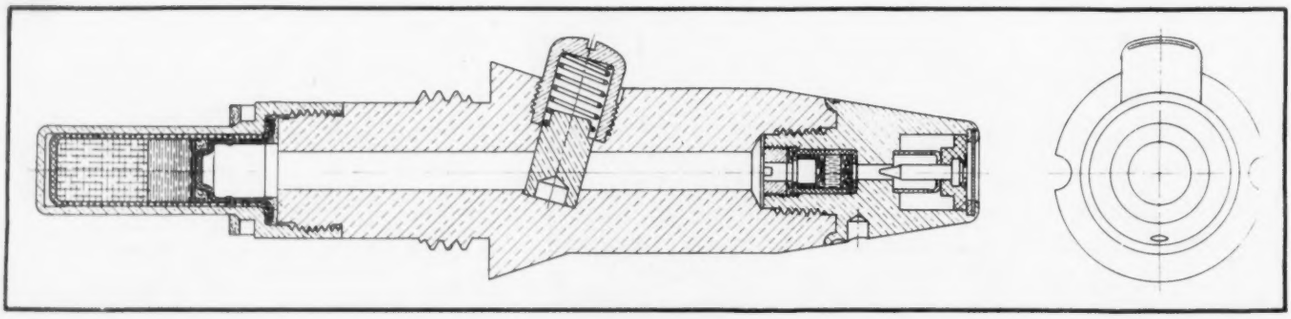
prevent forward buckling of the timing disk when the driving band enters the rifling of the gun. It has been found that if the copper driving band is not entering initially in the rifling, but if on the other hand the shell is placed in the bore some distance from this proper position, there is a sufficient "jar" to reverse the linear acceleration forces momentarily and so produce the effect on the relatively thin timing disk shown in dotted lines in Fig. 11. Should this happen, the lever arm would be free to rotate thus possibly exploding the shell before the desired interval had elapsed. The guard is necessary to prevent this forward buckling.

Wanted—A Mechanical Genius: In preparing the above article the author has had in mind the possibility of interesting some mechanical genius who will reduce the number of moving parts in the mechanical fuze. While the Ordnance Department has had sufficient experience both with the earlier M2 and the later M43 which developed from it to induce a certain confidence in the ability of this device to meet the demands upon it; and while it is felt that quantity production will lower the cost to that point where there will be no unfavorable comparisons with the powder train fuze, still it does appear as though there might be a simpler answer.

Bomb Fuzes: This resume of fuze development would hardly be complete without some reference to the type of fuze used on the airplane bomb. In the arming-vane type, the vane is held from turning by an arming wire which runs through an eye on the fuze body and a corresponding eye on the vane. Thus should the plane fall the bomb will not explode unless the vane is freed of the wire. In action, one end of the arming wire is held in the bomb rack, so when the bomb falls the other end of the wire is jerked free of the vane, which then proceeds to turn until it runs off, arming the bomb. Meantime the bomb has fallen a safe distance from the plane.

Segmental disks under the firing pin head then are free to fall out, leaving only a small diameter shear pin of soft brass to prevent contact of the striker and primer. Then follows in order the ignition of the delay element, if any is present, and of the detonator, the booster and finally the charge in the bomb. Thus the difference between shell and bomb fuzes lies in the means of arming and other factors resulting from the different initial linear and rotational velocities.

MODERN IMPACT FUZE



This is the modern form of the 1914-18 French long-nose impact fuze. (See STEEL, June 2, 1941, p. 52, Fig. 1.) Note that the shear wire in the earlier arrangement now has been replaced by a collapsible cylinder which supports the firing head and prevents descent of the firing pin until the closing disk on the nose is driven in by impact. Of course, this cylinder is strong enough to withstand acceleration forces during firing from the gun. Also, it is sufficiently sensitive to crumple even if the shell should strike a surface such as water

"SKID-LOAD"

economies further detailed

Reductions in cost up to 94 per cent of previous methods, made possible by the skid-load method, were detailed in STEEL, June 2, 1941, p. 64. Here typical savings on other items show the extreme range in weight, size and shape of units which can be handled by this method

By J. G. BUCUSS

■ AS WILL be shown by typical examples the skid-load method of crating and handling products into and out of storage and from plant to plant can be adapted to accommodate an extremely wide range of sizes, shapes, weights and types of product.

For instance, Fig. 1 illustrates how a large number of light weight though rather bulky parts are steel strapped together to form an efficient package for handling. These are automotive mufflers made from sheet steel and tubing. As much of the sheet metal used is 0.020 to 0.035-inch thick terne plate, the product is rather delicate and must be carefully guarded against crushing and denting in transit. Crushed or dented mufflers cannot be reclaimed.

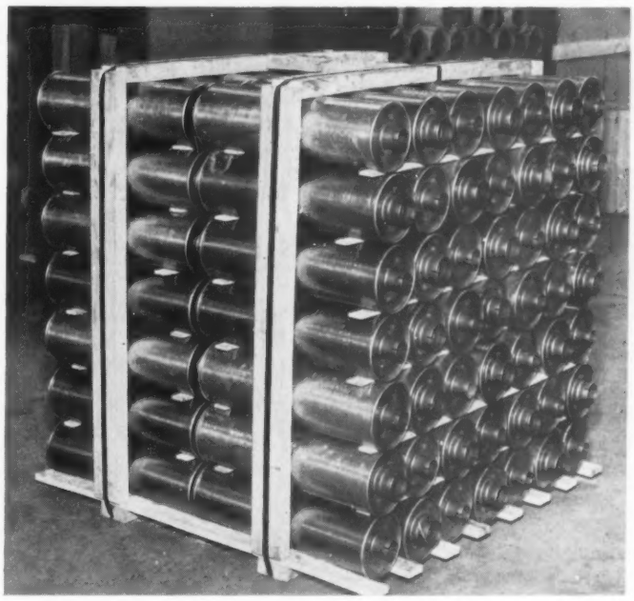


Fig. 1—Here light-weight bulky parts are wire strapped on wooden skids to make a direct saving of 36.8 per cent in cost of crating. Important additional savings in freight are also obtained

Previous to the introduction of the skid-load method, 81 mufflers were shipped together on a returnable dolly. The net weight was 735 pounds, and tare weight was approximately 150 pounds. There were some 80-point solid fiber used for covering and six pieces of lumber 1 x 4 x 67½ inches were used for side strips on each dolly. As the dollies were returnable, the direct cost for preparing the 81 mufflers for shipment was $0.394 for 11.25 board feet of lumber, $0.0023 for nails, $0.50 for two pieces of 80-point fiber board 62½ x 70 inches, $1.40 for 140 feet of corrugated board and $0.039 for 64.25 feet of 3-inch gummed tape, making a total cost of $2.335 for materials. Labor for loading the dolly, cutting the lumber and nailing guide strips and applying the fiber board amounted to $0.75 for 1.07 man-hours of work at $0.70 per hour. Thus total was $3.085 for 81 mufflers, or a cost of $0.038 per muffler.

This is contrasted with the present skid-load method which accommodates 98 mufflers on one skid load as shown in Fig. 1, the total net weight being 735 pounds. Cost of this skid is $0.858 for 26.974 board feet of lumber, $0.48 for 48 lathes and $0.009 for nails, plus $0.288 for 39.5 feet of steel band and $0.015 for three ¾-inch seals, making a total of $1.65 for materials. Labor to build skid, load skid and apply band amounts to $0.70 (one man-hour at $0.70); thus total cost of material and labor is $2.35 or $0.024 per muffler. This is a direct saving of $0.014 per muffler or 36.8 per cent. Additional savings accrue when the mufflers are stacked directly on the skid as they come from the production line.

Further, there is an important saving in freight charges. The dollies formerly used weighed 150 pounds each and cost $2.04 for freight to return them. The skid used with the skid-load method weighs only 80 pounds and can be returned at a cost of $0.55 for freight, making a direct saving in freight of $1.49 or at least $0.015 per muffler, and this does not allow for the fact that the skid-load holds 98 mufflers, whereas the dollies only hold 81.

However, this is not the true condition because the above cost comparison includes total cost of the skid for the skid-load method, thus permitting it to be thrown away and not returned at all so really the entire freight charge of returning the dolly is saved, $2.04. Or else if the comparison were to be based upon returning the present skid, the total cost for lumber of $1.35 would be saved since it then would not be necessary to furnish new skids. In either case it is evident the total saving is a most important figure.

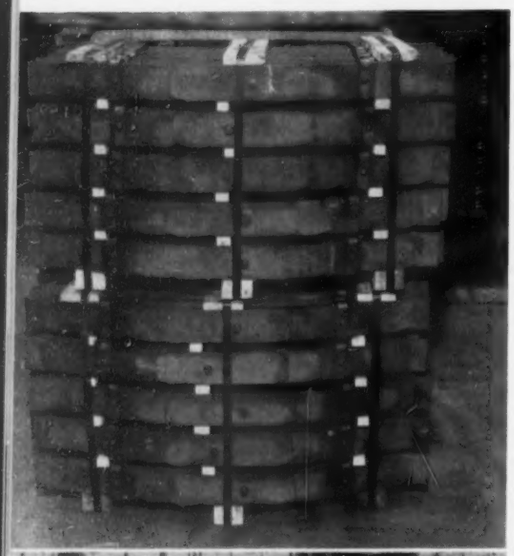
Heavy, Compact Loading: Fig. 2 illustrates just the opposite type of loading—a very heavy compact item. Before the introduction of the skid-load method, these automotive and truck springs were handled loose—that is, they were lifted and piled on the delivery truck by hand, then delivered to the customer who handled them individually, separate handling being involved at each point of movement. This was a hazardous method with the possibility of smashed fingers and toes, sprained backs and the like. While the cost was not large, a considerable amount of time was involved in loading and unloading. For example, it took one man about an hour to unload a truckload of one hundred 60-pound springs.

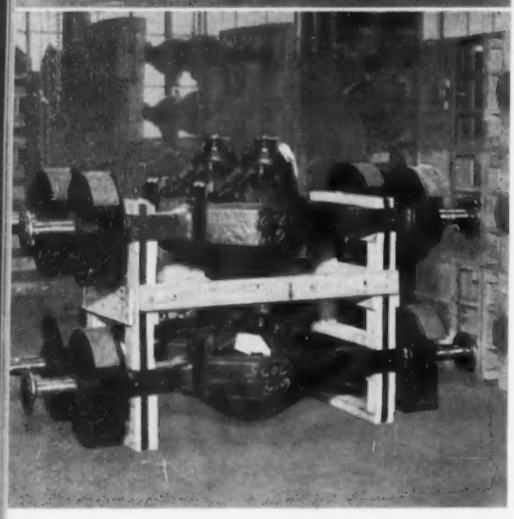
By the skid-load method, 56 springs are steel strapped together to form a bundle, there being five layers of 11 springs each with an extra spring in the third tier. As each spring weighs 60 pounds, this makes a total load of 3360 pounds.

Cost of this package runs $0.35 for 10.002 board feet of lumber, $0.241 for 33 feet of steel band

and $0.015 for three seals, making a total of $0.606 for material. Labor cost for cutting the lumber, piling the springs and applying the three bands is $0.35 since it takes ½-man-hour at $0.70 per hour rate. But in actual production, the springs are piled on the skid as they come off the production line so most of this labor cost can be eliminated. This would make the total cost slightly under the older method where they are stacked entirely by hand.

Here the savings afforded by the skid-load method are in elimination of rehandling during subsequent movement into storage, to and from





freight cars and in and out of storage at the receiving end. Another important advantage is that accruing from the ability to stack the skid-load bundles in tiers two or three loads high, thus doubling and tripling warehouse capacity.

Large, Heavy, Awkward Loads: A third example shows how exceptionally heavy, awkward loads are easily accommodated by the skid-load method of handling. Formerly these automotive axles were housed in crates, each axle having two crates applied over the brake-drum housings. They were put in that position for any matter of protection, but the purpose was to get a great span between the supports for maximum stiffness of the crate as the net weight of one of these rear axles is 764 pounds.

By the former method, crating each axle individually required 23.224 board feet of lumber, costing $0.815, and nails costing $0.179—a total of $0.994 for material. It took 2 man-hours at $0.70 per hour to build a crate, making a cost of $1.40 for labor, so the total was $2.394 for labor and material. This also was the figure for unit cost per axle since each crate accommodated only one axle.

When changed over to the skid-load method, four axles are handled as a unit as shown in Fig. 3, the total net weight being 3056 pounds. This crating requires 31.454 board feet, costing $1.10; nails, costing $0.045; 22.7 feet of steel strapping with two seals costing $0.28; making a total of $1.425

Fig. 2. (Above)—Heavy compact loadings also are easily handled by the skid-load method. It permits 56 springs to be handled as a unit, greatly facilitating loading and unloading operations, handling in and out of storage and the like

Fig. 3. (Below)—Large, heavy, awkward parts such as these truck axles can be made into packages to cut shipping costs. This package affords a direct saving of 81.4 per cent in cost of crating and permits other important savings from increased handling efficiency and smaller storage space required

for material. Labor required to build the skid and strap the work on is ½-man-hour, cost of $0.35 for labor. Then total cost for material and labor is $1.775, which is $0.444 per axle to give a saving of $1.95 for each axle.

A further saving made possible by packing four axles in one unit is reduction in number of packages to be handled. Instead of handling each axle individually, four are handled at a time, making possible faster loading and unloading. In addition these unit skid loads are tiered, affording an added saving in storage and transfer space.

Thus, in this instance, not only was a direct saving of 81.4 per cent obtained in the cost of the crate and crating alone, but other savings accrued due to increased handling efficiency and smaller storage space required.

These examples, instead of being rare cases, actually are only typical of the savings afforded by this method of crating and handling.

It will be noted that in all cases above, no figures have been given for actual savings in transportation made possible by the more efficient package. In many instances, these will equal or exceed the direct savings made possible in the cost of the crate.

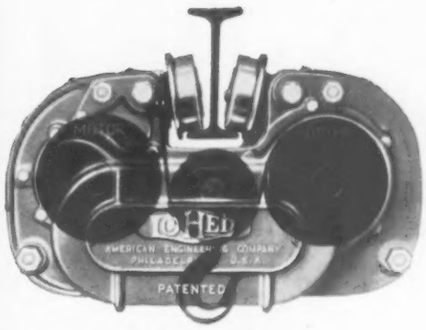
It is apparent the method has not only an extremely wide range of adaptability, but the savings it affords are exceptionally worthwhile. Today there is scarcely a plant in which some form of this system could not be adapted to advantage.

Can Return Skids, Too: Also, in many cases where the figures were based on discarding the skids, it is quite possible to return the skids and reuse them, making an additional significant saving.

An example of this follows: In packaging automotive wheels by the old method, 30 wheels were crated at a cost of $0.635 for material and $1.044 for labor, a total of $1.68 for 30 wheels. By the skid-load process, material cost was $1.874, labor was $0.65, totaling $2.524 for the 30 wheels. Note that this is considerably higher than the original method. However, through an arrangement with the receiver of these packages, the skids are returned at a cost of $0.17 for freight. This results in a saving of $1.10 per package on each shipment made thereafter and brings the cost of the skid-load method considerably below that of the older method.

Then, too, this comparison does not consider the large savings effected at the receiving plant in the handling of these packages. As a matter of fact, this saving in labor at the customer's plant is often the primary reason for installing the system between two plants.

As another example of the savings afforded by the system in addition to direct savings, certain automotive drive axles originally were placed in individual crates whose cost was $0.15 for each axle. In loading the motor truck for shipment it was necessary to wheel these crates on a hand truck to the motor truck, tier them by hand and employ considerable dunnage to secure a compact level load which would safely carry to destination. By the skid-load method, 16 of these units are leveled together in a compact unit which costs $2.29, slightly under the $0.15 per axle figure originally. However, the saving comes in elimination of 600 pounds of dunnage formerly required plus the fact that the axles now always arrive at destination undamaged, plus a considerable saving effected in the customer's plant in handling the axles in unit packages of 16.



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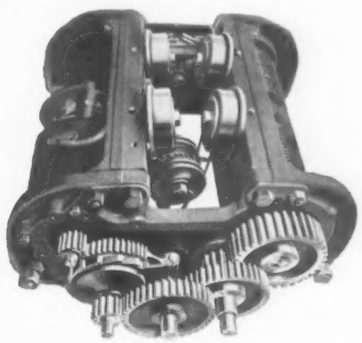

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As shown in accompanying illustrations, the siding consists of sheets formed to give the appearance of board siding. Each formed sheet provides a net covering width of 24 inches, allowing ½-inch at each edge for overlapping. Lengths up to 10 feet 3 inches are furnished, providing a net covering length of 10 feet with a 3-inch end lap allowance. The standard weatherboard siding sheet and trimmings are formed from 26-gage galvanized steel sheet, the zinc coating meeting federal specifications Q. Q.-I-696 Class C—capable of withstanding three 1-minute dips in a standard Preece test.

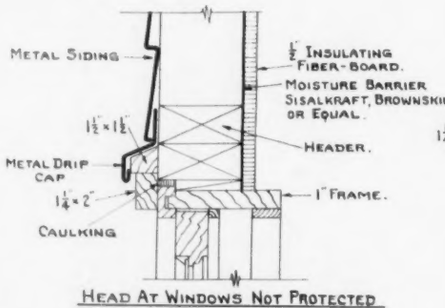
After being galvanized, the flat sheets are roller coated on the side to be exposed, one coat of baked-on zinc-oxide primer conforming to federal specification T. T.-641 Type II Class B, being baked on at 400 degrees Fahr. This paint contains 9½ pounds of zinc dust per gallon and weighs over 16 pounds per gallon. The finished painted sheets withstand subsequent forming operations without crazing or flaking, provide against corrosion, afford an excellent paint base for the two coats of steel paint applied after erection.

The siding is formed by passing through heavy rolls to simulate wooden clapboards with 4-inch faces. The siding is nailed directly to wooden studs on 2-foot centers, using 10-gage hot-galvanized umbrella-type nails 1½ inches long, one nail at each 4-inch face of the siding on each stud. In addition, a 3/16 x ½-inch galvanized stove bolt is located midway between each stud, passing through the lapped edges of the two sheets.

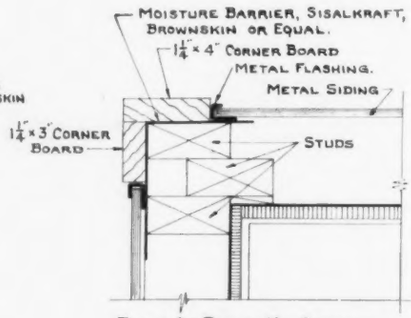
Practically all sheets are factory sheared to fit in place on the standardized buildings. Cutting or slitting to make odd fits in the field is easily accomplished with conventional portable electric-driven circular saws equipped with blades for cutting sheet steel. A cutting speed of 10 feet per minute on the 26-gage sheet is had with this method. The interior side of the studs is covered first with ½-inch insulating fiberboard, on top of which is placed a 4-foot wainscot of plywood such as "Prestwood." A conventional baseboard also is added.

This combination of steel siding, enclosed air space and insulating board provides satisfactory insulation in all weather zones as well as a pleasing exterior and interior appearance.

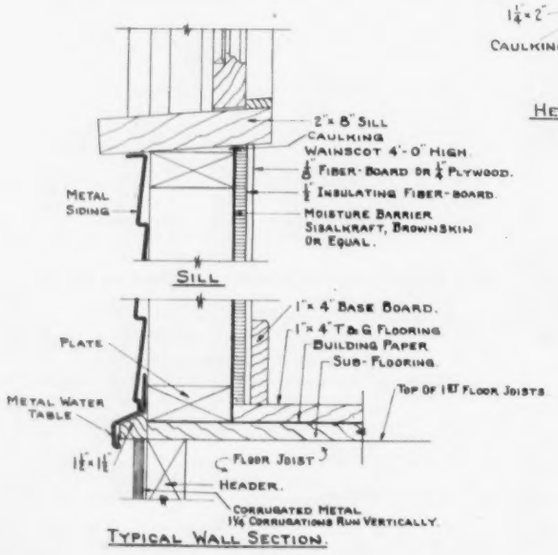
Illustrated are typical details of wall construction with metal siding as developed by the Construction Division, Office of the Quartermaster General, including various types of trimmings or flashings for windows, doors, etc.; also character of the formation given the siding sheets to simulate wooden clapboard.



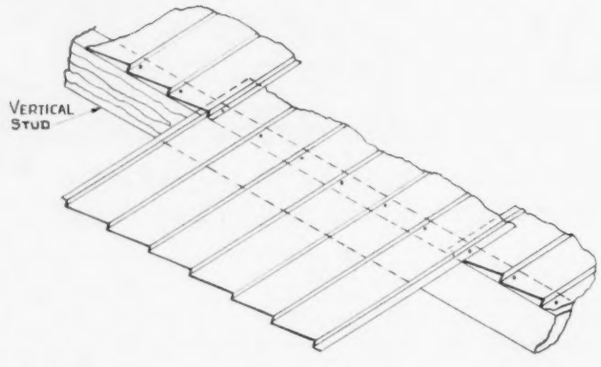
HEAD AT WINDOWS NOT PROTECTED BY HOOD OR ROOF OVERHANG.

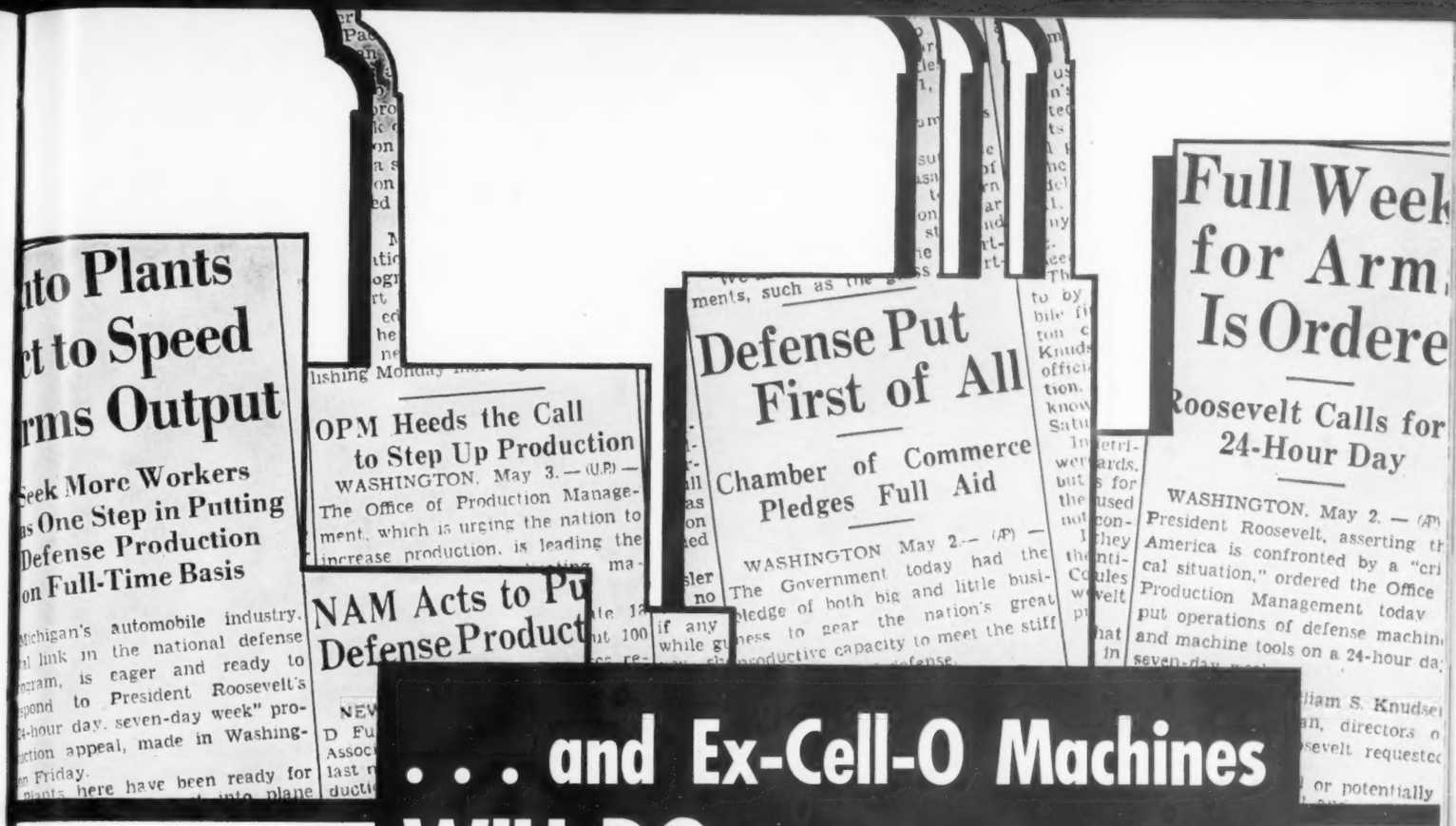


PLAN AT BUILT-UP CORNER.



TYPICAL WALL SECTION.





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ADVERTISING PAGES REMOVED

PSYCHOLOGICAL ASPECTS of GROUP SAFETY IN STEEL PLANTS

Safety department becomes more efficient when it abandons the practice of ridiculing the careless worker and substitutes instead a campaign to prove the average and even the brilliant worker is in great danger. By identifying the message with himself personally, the rate of industrial accidents is found to decrease

By THOMAS LOCKE
Pittsburgh

■ ONE OF the most promising means of lowering the accident rate in the steel industry today, lies in a careful consideration of the effect of the present accident prevention program on the group psychology of the workers.

When management first became conscious of the value, both to itself and the workers of "Safety First," marvelous gains were made by the introduction of machine guards and engineering revisions, which made it impossible for the worker, no matter how careless, to injure himself. Although there still may be room for mechanical improvement, even in a plant where the use of the most up-to-date guards is universal, safety directors must be cautioned against considering all accidents from the angle of "what mechanical improvement can be made?"

The psychological side of accident prevention has been given much attention recently. Many articles have been written by psychiatrists in the employ of insurance companies, vitally interested in safety because of the millions of dollars worth of compensation insurance annually carried by the steel industry. Up to now, however, psychology has been considered mainly from the angle of the maladjusted individual as an accident hazard. Psychologists have concerned themselves with the discovery and proper care of the neurotic workers.

Means used at one plant to remind men to wear goggles when grinding

The only way the safety department can influence the worker is by pointing out certain dangers in his working environment, establishing rules of safe conduct, and then warning of the dangers to life and limb which are present if these rules are disobeyed. The most difficult factor involved in the giving of such warning to a group is the tendency on the part of each individual to consider the warning intended for the group around him, and not for himself. If each individual could be made to identify the message with himself, personally, industrial accidents would become much more rare.

Phychologists have proved it almost impossible for the imagination to conceive of a condition which has not existed in the experience of the individual. The consciousness of living and being alive is strongly implanted in the human ego. In the experience of the individual, no other condition has ever existed, so it is difficult to make him imagine that he himself could suddenly cease to live, no matter how strongly he is so warned by his safety leaders.

To a somewhat lesser extent, this same obstacle must be faced by group leaders seeking to convince the men that they are in danger of losing an arm or a leg. It is possible for the individual to imagine himself being hurt, as most every one has experienced pain at one time or another, but it is difficult to imagine the body as not being whole.

This is the resistance to be broken down by the safety department. It is a resistance that never subsides. The safety leader is usually playing with two strikes against him in his effort to convince the individual worker that he himself, and not the fellow he works with is the person to whom the safety campaign is directed. The moment the safety department gives the individual the slightest chance to reason that the message is not intended directly for him, it has failed in its effort to break down this resistance.

If the safety message is not to

THE DAILY DEVIL
LITTLE EDITOR
at home - He holds the record for being
AUGUST 8, 1927
FIRST VALUE
IDEAS are the fruits of IMAGINATION

Many plants employ bulletin boards to get safety messages across to workmen

be cast aside by the subconscious mind of the worker, management must concentrate not only in bringing safety to the attention of the worker, but in arousing his genuine interest in it, making him desire it as something important to himself personally and causing him to act in accordance with safe practices on which he personally is thoroughly sold by a safety department in which he has complete confidence and respect.

Correspondence with safety directors and the reading of the safety literature put out by some of the major steel companies in the country, indicate that two changes in the standard accident prevention programs, would make it much easier for the individual to identify the safety message with him self.

Practice Should Be Stopped

First, the practice of holding the careless worker up to ridicule, with the implication that it is only the stupid man who gets injured, should be stopped; and second, a more thorough consideration should be made of the effect on the psychology of the group of the present practice, in regard to minor accidents.

Question: "Find the man who didn't believe in safety first?" A poster depicts ten men standing in a line. In the center of the group is a man on crutches, with his arm in a sling. On top of his bandaged head is a large dunce cap. This poster is typical, not only of much of the printed material put out by the average safety department, but also of the opinion expressed in many safety lectures. However effective this method may be in putting across the safety message, it does more harm than good by making it easier for the individual to pass off the message as being intended for someone else. In my experience among workmen, I have never found a really stupid person who was the least bit aware of that fact. In fact, usually the most stupid person, and the person for whom this message is intended is the least affected by it.

Ridicule Is Not Effective

The safety message is so simple that it can be understood how the safety director, faced with the job of keeping it continuously in front of the men, can drift into the error of ridiculing the injured man. But it is not only important to keep the message in front of the men; the most important thing is to make each worker aware of his personal danger and his obligation to work safely.

Nothing about the modern safety campaign does as much to make the average worker lose respect for, and thus confidence in his safety department, than the seeming over emphasis which is placed on minor accidents. This feeling of overemphasis, which is the first thing the average worker mentions when asked what he thinks about the safety program, could be eliminated if an attempt were made to distinguish between the various types of minor accidents.

A minor accident is defined as one not sufficiently serious to prevent the injured man from reporting to work the next working day following the accident. Although compensation rates are usually based on the number of lost time accidents per million man hours worked, and minor accidents are seldom mentioned in the annual statistics of the corporations, the major attention of the safety programs in the individual plants and shops is directed against the minor accidents. The reason for this is a statistical phenomena. It is an almost unbelievably consistent fact that in any shop or plant where records have been kept for any period of time, an exact ratio exists between the number of minor accidents, regardless of type, and the number of lost time accidents. The easily understood excuse offered by safety leaders for their intensive investigation of accidents resulting in the most trivial of scratches and bruises, is that the only connection that can be found between the minor accidents in the shop and the lost time accidents is one of statistics. The minor accidents rarely have any similarity either in type or location to the lost time accident. But almost invariably over a given period of time, for every so many minor accidents, a lost time accident will occur.

Minor Accidents Important

This situation may vary between different shops and parts of a mill, ranging usually from 30 to 50 minor accidents to every lost time case, but the ratios remain constant for the particular shop in which it is computed. Using this ratio, many safety directors claim they are able to accurately predict almost to the week, or the day in the week, by the minor accident curve, just when the next lost time case will occur. The best way, then, to cut down the number of lost time accidents would seem to be by concentrating on the minor accidents, regardless of the effect of this concentration on the attitude of the workers.

It is on this point that the possi-

bility of the safety department completely selling its program to the individual is wrecked. "But what else can we do?" ask the safety leaders. One thing that can be done is to make minor accident records a more accurate criteria of shop danger, by distinguishing between those which show proof of real danger to the injured worker, and those whose only importance lies in preventing infection.

The small scratch, bruise, or puncture of the skin is the most difficult safety problem to be handled by heads of safety departments. It is a common practice to penalize the worker who lets any injury, no matter how slight, go unreported. The germs of tetanus and streptococcus are so insidious and deadly that it would never pay to relax this vigil. But what of the attitude of workers to the safety department? All his life, he has probably let such cuts and bruises go unattended or has attended to them himself, with no bad results. In the majority of cases, no ill effects would occur if he followed the same procedure with the injuries he received in the mill. True, he has heard of cases where scratches have led to serious infection and even death. Here again, the consciousness of his own personal danger is hard to sell. It is in cases like this that a new approach should be made.

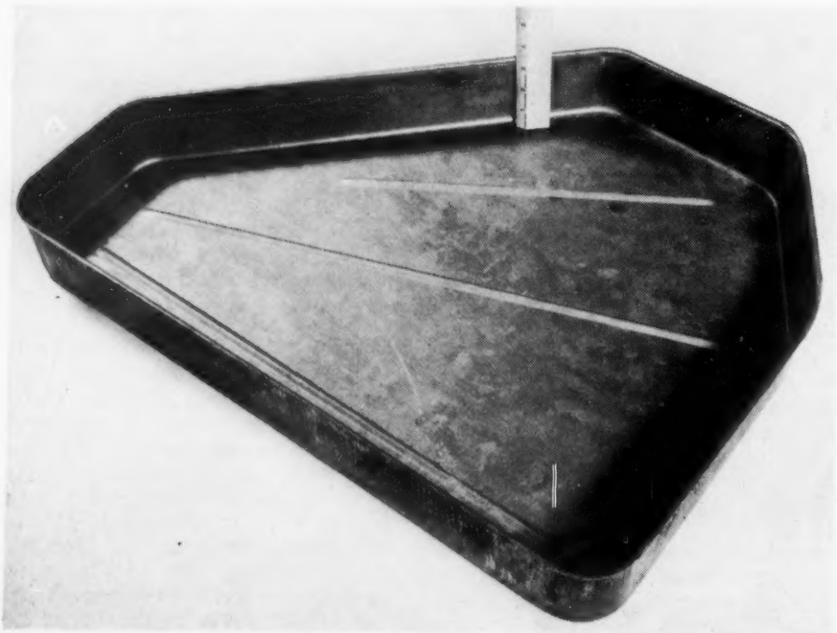
Need the safety leaders strain their imagination and the credulity of the man to prove that he was in error when he received his scratch? Infection is what needs to be prevented in cases like this, and by classifying them as we do accidents, we tear down the whole attitude of the men towards accidents, as well as their confidence in the men who are conducting their accident program. In cases like this, the shop foreman, struggling under pressure from above to keep the shop's accident rate down, is faced with a ticklish situation. It is hard for him to decide whether to see all scratches, when he knows that the smallest reported scratch will count as much against the shop accident record as an accident in which the worker is only with difficulty able to report to work next day. Towards new men with small scratches, the older workmen are liable to take the attitude, "It's my duty to tell you to report that scratch to the foreman, but if I were you, and didn't want everyone from the vice president down asking you questions, I'd forget it and not let the foreman see it." The average worker who suffers a scratch thus is faced with a dilemma. If he reports it at once, he will be subject to a long investigation with some danger of hurting his plant rating. If he lets it go and it develops into something serious, he will be classed as a "delayed case" and subjected to severe reprimands.

Avoid Illogical Emphasis

Safety men, trying to explain the close correlation between the number of minor accidents and a lost time case, reason that the growing curve of minor accidents always shows a growing laxness on the part of the men toward the safety idea. This leads to one of the two personal factors always present in an accident, either a momentary lack of physical co-ordination, or temporary inattention, caused by mental or emotional preoccupation. All these symptoms and the final result can be caused by a feeling of disrespect for the safety program, due to the illogical emphasis which has been placed on minor accidents. As the number of these petty cases mount, this feeling of *disrespect* increases, until the inevitable moment of inattention or incoordination results in a real lost time case.

A slight change in the standard accident program would help relieve this trouble. A new grouping could be made to cover these cases which demand first aid, but which in themselves, do not constitute a serious risk of a major accident to the injured party or his fellow workmen. Perhaps they could be called "first aid cases" and their control would be considered an "infection prevention." Great stress should be made of the fact that the "infection prevention" program is entirely separate from the "accident prevention" program. The worker requesting first aid treatment should be convinced that instead of endangering his rating, he is, if anything, improving it. Infection prevention cases should be tabulated separately from accident cases, both in the monthly and yearly statistics of the various shops, and in any contests that are carried on between shops. The problem of differentiating between a minor accident and an infection prevention case would be delicate, but it would pay big dividends in an increased confidence of the men, and a lowering of the lost time accident rate. By eliminating this maze of ill-feeling, which, even in the most well-planned safety programs occasionally clouds the picture, safety directors would be able to more effectively tackle their real problem, making each individual worker in the group aware of his personal obligation to put safety first.

Zinc Coated Sheets Withstand Forming Operation



■ **Severe forming without peeling or flaking of the zinc coating, and a bonderized mill treatment to provide a neutral surface for immediate painting are the outstanding features of American Rolling Mill Co.'s recently developed Zincgrip Paintgrip sheet metal. An interesting example of the use of this metal is the fuel reservoir, shown above, fabricated by Chattanooga Stamping & Enameling Co., for use in refrigerators. When completed, these reservoir pans are 26¼ inches long, 19½ inches wide at the widest point and 3½ inches deep. During fabrication, only a soapy water solution is used to prepare the sheets for the dies**

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Westinghouse
GEARED DRIVES

BETWEEN HEATS

WITH *Shorty*

■ Say Fellers:

A couple of the boys from the electrical department met me out in the yard not long ago 'n one of 'em sez, "Boss, the Iron 'n Steel Electrical Ingineers are holdin' a shin dig down at Youngstown, O., in a week or so. It's their big Spring meeting 'n a lotta fellers will be there listenin' to the guys on the program and chattin' to trouble-shooters as the likes of us. Jerry 'n I would like to 'tend the meetin'. What's the chances of takin' 'er in?"

'Fore I could give 'im an answer Jerry began talkin'. He sez, "Y' see, Boss, every day's a battle 'round the plant here 'n the fellers that are to be pitied are those who never get the opportunity of stirrin' outta their shanty—jus' like Bill and me. We get a lotta dope by talkin' over our troubles with the fellers from other plants 'n if y' don't mind we'd like to take the day off and take in the meetin'. Whaddaya say?"

"Alright, fellers," I sez, "only don't forget to turn in a report on the meetin' when y' get back."

Follows Boss' Orders

The day followin' the meeting I gotta a note from the boys and here's what they had to say:

"Dear Boss: Remember 'fore we left the plant for the Ingineers meetin' y' said y' wondered if there would be many of the big boys and ol' timers 'tending the affair? Well they sure were on the job. L. F. Coffin of Bethlehem's Sparrows Point plant, C. L. McGranahan of J. & L., Frank E. Flynn of Republic, James Farrington of Wheeling Steel Corp., H. G. R. Bennett of Carnegie-Illinois, W. A. Perry of Inland, and J. H. Carter of Sharon Steel Corp. and plenty more of the fellers we all know were there.

"Speakin' 'bout Sharon Steel Corp.—the Ingineers were guests of its Sharon division right after they finished the mornin' session and had a bite of grub. Seven bus loads of the fellers pulled up at the clockhouse 'bout 2:30 p.m. and divided into squads. Who do y' suppose was struttin' 'long with the bunch that Jerry and I were with? None other than your ol' friend Dad Greenwood who used to be safety engineer at the Ohio Works for Carnegie Steel. Dad tells me he 's goin' on 95 years of age and that it doesn't seem so long since he was a drummer boy in the Civil war.

"As we walked along we headed toward a building that had '57' painted on it. One guy sez, 'There 's the pickle house.' Matter of fact, it was the annealing building, but he got the rasberries from 'is buddies jus' the same. At the top of a flag pole out in the yard Ol' Glory was wavin' like a dandy. She was fightin' with the smoke and dirt but she was a wavin' jus' the same. Searchlights on the clockhouse indicated the plant was set up for sabatoge.

Style Show Aint Nothin'

"Wish the fashion experts could drop in at this plant some day and get an idea for Spring millinery. Caps of all kinds, hats with homemade sawtooth brims, gingham skull caps and bonnets creased in a variety of shapes. It takes the guys in the steel mills to give y' some classy ideas.

"Over in one of the band mills they were operatin' a strand of 9-inch roughin' rolls with a rope drive. Not many of these drives left in the country any more. She was still knockin' out steel. Little further on we passed a coke jack. The sides were buckled cuz the boys kept 'er goin' pretty strong. But they can store 'er away now, 'n get ready to turn on the mancooling fans.

"Roundin' the corner of one of the heatin' furnaces we came onto the pusher. He was takin' a spell out, restin' on a homemade chair of Cape Cod style. She was all wired together. Either his buddie was a 250 pounder or else the ol' chair got double duty on the night shift.

"As we entered the hot strip building over at the right s i d e-wall we spied an ol' cast-iron water trough used for coolin' the tools. I betcha many a swell-headed mamma's boy gotta duckin' in that tub and that many a bottle of milk has been kept cool in its depths.

"The brick floor was gouged out opposite the coiling station in such a way that y' could tell plenty of tonnage had passed over 'er to the loadin' platform.

"Over in the cold mill they were knockin' out some pretty stuff on a 4-stand cluster mill. Sorta smelled like y' were 'round the tinning machines over in the tin house. No wonder. Between each stand they had a bag of palm oil rubbin' on the surface of the strip so as to help 'long reduction.

Machine Knocks 'er Out

"Jus' 'cross the aisle a feller was feedin' strip through a miniature set of dies so as to give 'er a slight bow. 'N when the bowed stock built up in a pile at the rear she was ready for venetian blinds. Hot dickety dog! He sure was layin' 'er down.

"Boss, I've seen 'bout as much strip as any guy 'round our mill but I guess y' gotta get over into the other feller's yard to see variety. We saw strip in flats 'n coils, narrow 'n wide, thick 'n thin, black 'n shiny, boxed 'n baled, burlap wrapped 'n paper wrapped. Jus' one of those things y' don't notice in your own plant.

"Jus' as we got back to the buses a new shift of men was coming on duty. Some had their lunch packed in a kit, others had it wrapped in paper, still others had it in a dinner pail dangling from their hands. Black men, white men; Americans, foreigners; some trudging along with slow stride, others with a quick and snappy spring in their step.

" 'N when we seated ourselves in the bus waitin' fer the rest of the bunch to return, I looked outta the window 'n there came your ol' friend Dad Greenwood. You'd think an ol' timer like Dad would be played out after poundin' the mill floor fer a couple of hours. But not Dad. His 93 years of livin' never phased 'im. He was struttin' along jus' like one of the gang on 'is way to "shoot trouble.

"That's the story, Boss. 'N Jerry 'n I want to thank y' for lettin' us attend. The company 'll get 'er back in double portion, I'll betcha."

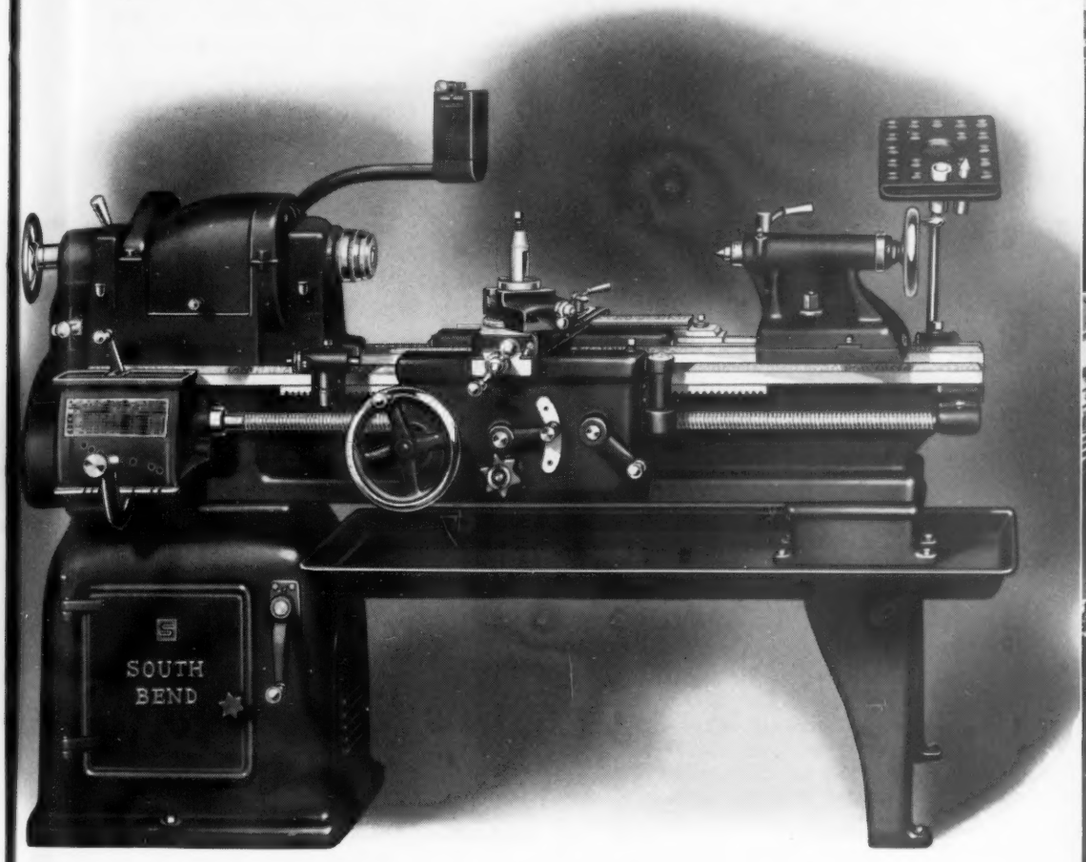
* * *

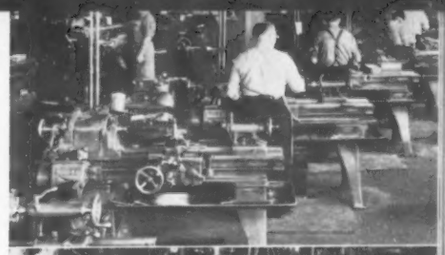
We've always found an interchange of ideas is a good thing for the fellers out in the plant 'n there 's no better way of doin' it than sendin' them to meetin's.

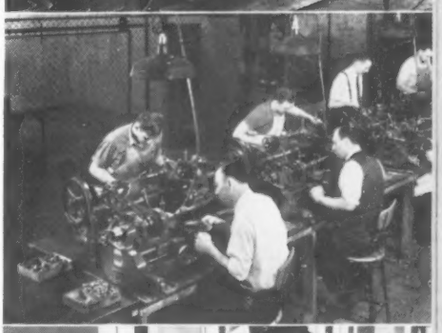
So long, fellers, I'll be seein' ya.

"Shorty" Long

For
MODERN SHOPS







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But no sacrifice in quality has been made to speed up the production of South Bend Lathes—nor will there be a lowering of our standards. The same rigid inspection tests—the same skilled workmanship—the same high quality materials will be maintained. South Bend Lathes are made in five sizes: 9″, 10″, 13″, 14½″ and 16″ swing, 3′ to 12′ bed lengths, in Tool Room or Manufacturing types, with countershaft or motor drive. Write for a catalog and name of your nearest dealer.

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A Quick Anneal for HIGH-CARBON HIGH-CHROMIUM Die Steels

A new process anneals all high-carbon high-chromium tool and die steels completely in from 20 to 30 minutes, thus making quick repair possible and making it practical to reclaim many worn, broken and obsolete die parts. With the growing scarcity of chromium steels, the advantages of this development may become increasingly important. Process also works well on high-speed die steels

By B. L. ROBINSON
And
R. C. PRUITT
605 West Fifth Street
Seymour, Ind.

■ TODAY thousands of tons of worn, broken and obsolete die parts of high-carbon high-chromium tool steel are lying in tool shops about the nation. From time to time many of these are repaired and reused from necessity. However, an extremely large portion remains unreclaimed because the heat treating operator ordinarily prefers not to tie up his furnace overnight with the regular annealing procedure. The adoption of the new Robinson-Pruitt quick anneal process should make available much of this metal for further use and so should prove a definite help in the present defense effort.

Possibly of equal importance is the speed of the process, making it particularly valuable for quickly repairing broken parts. By this method, a broken high-carbon high-chromium steel die can be annealed and in the shaper or lathe in about 30 minutes and ready to harden a full day earlier than if processed by conventional methods.

This development is the result of experiments begun more than a year ago in the hope of evolving a quick anneal for the high-carbon high-chromium tool steels. Nine months later the process had been perfected so it produced a satisfactory hardness value.

One of the first tests of the process under heavy production was on a blanking punch, Fig. 1, which chipped off on one corner. This punch was used on a job running 15,000 pieces per day, and there was no spare punch. When it broke at 8:30 one morning, it was pulled from the press, annealed by the new process and taken to the waiting shaper, from which it went to the drill press to be counterbored, on to the surface grinder for a few minutes and into the furnace for heat treatment. Note in Fig. 1 that normal height was restored by use of a shim whose thickness equaled amount of metal broken and machined off.

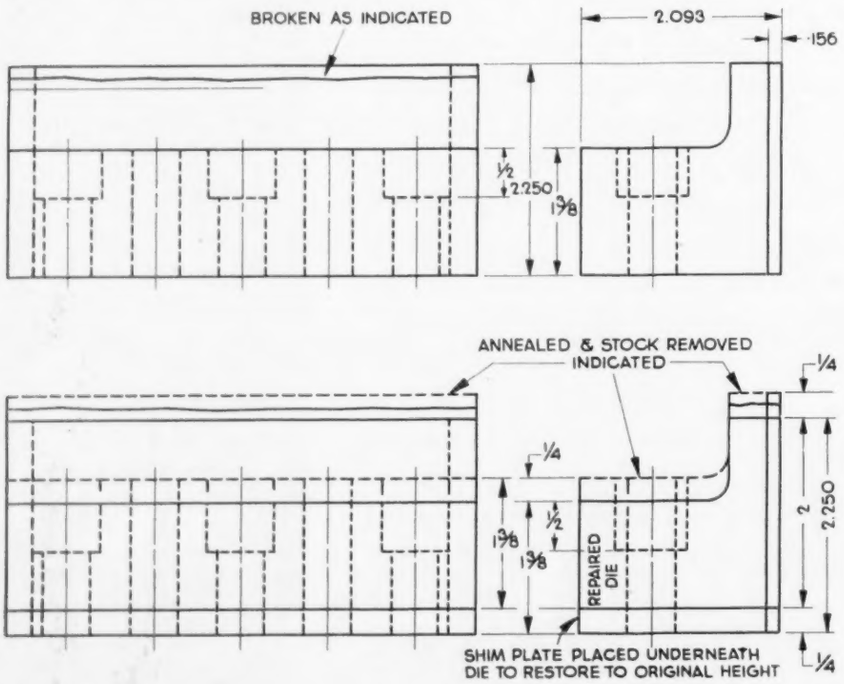


Fig. 1—This die broke as shown by the wavy line in upper view. It was repaired and back in service again in just 4½ hours, averting a full day's shutdown, by use of the Robinson-Pruitt process and since then has produced more than a million pieces

Repaired in Several Hours

The break occurred at 8:30 in the morning, but when the operator returned at noon, the die had been completely repaired and was in the press ready to operate. A full day's shutdown had been averted. Since this incident, more than a million pieces have been run over this die—evidence that the process in no way shortens die life.

Since it was desired to obtain a metallurgical analysis of the material after it had been annealed by the new process, a sample was submitted to Dr. Arthur E. Focke, metallurgist, Diamond Chain Co., Indianapolis. The sample submitted was compared to a standard piece of the same type of steel. The hardness of the annealed sample tested 15 to 25 rockwell C compared with 13 to 15 for the standard. Microstructure of the sample was essentially the same as the standard—large cementite particles with multitudes of fine particles in a ferrite matrix.

After heating to 1850 degrees Fahr. for 30 minutes and cooling in air, the sample tested from 63 to 64 rockwell C in hardness, which compared to 63 to 64½ for the standard. Microstructure of the hardened sample was essentially the same as the standard except grain size was found to be somewhat finer. Both exhibited large cementite particles in a martensitic matrix. Dr. Focke reported the sample appeared to be essentially identical to the standard both before and after heat treatment.

The few steel men who have already seen the results of the process have asked a number of questions, the answers to which may also be of interest to others.

Do you increase austenite? Not as far as can be ascertained. The

steel maintains its magnetic property, and there appears to be no increase or decrease in austenite.

Is the process costly and complicated? The answer is neither, for the cost is less than that involved with standard procedure, and the process is so simple that any competent heat treater can use it successfully.

How does it wear in a die? Wear appears excellent. By substituting segments in a die, proof has been obtained that steel processed by the new method will usually outwear steel given standard treatment, due in part to the finer grain produced by the Robinson-Pruitt process.

Is the steel hard inside? All portions of the steel are practically the same, no difference being detectible.

Does the process warp the steel or set up stresses in the part? The answer to this is seen in Fig. 2, which shows a worn punch approximately 6½ inches in diameter and 2 inches thick of high-carbon high-chromium AirDie steel. This part has a shape almost identical with that specified in the standard navy test. The part was annealed and rehardened to 64 rockwell C and yet retained its shape accurately. It is now working in a die as well as it did before being treated.

Can the process be used on a forged die? This is not exactly known since no occasion has yet arisen to try it on a forged die. However, forgings have been taken out of stock, hardened to 65 rockwell C, subsequently annealed by the new process and rehardened with excellent results. Such a test was made in the presence of Ray Calbert of Ajax Steel & Forge Co., 205 Adair, Detroit. His personal opinion was that the process would work on forgings.

How does it machine? The answer to this one is particularly interesting because the material machines much better than the hardness value might indicate. Toolmakers prefer it to steel that has been annealed by standard procedure. The reason appears to be the finer, more uniform grain structure produced.

Fig. 2—This blanking punch, shape of which is almost identical to that specified in standard navy distortion test, underwent the quick anneal without showing any distortion and now is working in a die as well as before treatment. Photo by R. C. Pruitt

Washington Releases Revised Gage Standards

■ A revised standard for gage blanks accepted by producers and users was recently released by the National Bureau of Standards, Department of Commerce, Washington, under the title, "Gage Blanks, Commercial Standard CS8-41". It recognizes the progress in gaging practice since 1933 by the incorporation of new standards for thread setting plug gages, taper thread ring gages, dial indicators, and master disks. Standard designs without complete dimensional specifications are proposed for spline plug and ring gages, taper plug and ring gages, flush-pin gages, built-up snap gages and flat plug gages.

Adjustable length gages are completely revised, and minor changes are incorporated in the standards for trilock handles, plain and thread ring gages in the smallest ranges, taper plug and ring gages for checking taper lock handles and gaging members, plain adjustable snap gages and twin ring gage blanks.

In promulgating this standard, it is not the intention to render obsolete existing stocks of gages in the hands of manufacturers or users; rather, the purpose is to provide a standard which can be gradually adopted in the replacement.

The revised standard is effective for new production from Jan. 1, 1941, and for clearance of existing stocks on Jan. 1, 1942. Copies are obtainable from the superintendent of documents, Government Printing Office, for 15 cents each.

Offers New Crimped Designs of Bonded Metal

■ Several new crimped designs in bonded prefinished metals are being offered by American Nickeloid Co., Peru, Ill., for application on units requiring decorative treatment.

One of these, termed a "7/16-inch crimp," is available in horizontal, diagonal, square and diamond patterns in a variety of metal thicknesses. It is available in most patterns in sheet sizes up to 24 x 36 inches. The second design, termed an "oval crimp," is introduced in two widths—⅛ and 3/16-inch—in long, continuous coils, and in gages ranging from 0.010 to 0.015-inch.

Both crimps are offered in bright or satin finishes of nickel, brass, chromium or copper electro-bonded to basic metals of steel, zinc or brass. The rounded contour of the oval crimp makes it adaptable for inlay purposes. The 7/16-inch crimp is being offered for a variety of purposes including reflectors, stove pads, electrical appliances, display stands and signs.

New Agent Puts Out Magnesium Fires

■ A new extinguishing agent for magnesium fires and incendiary bombs is reported by Pyrene Mfg. Co., Newark, N. J. Known as Pyrene G-1 fire extinguishing powder, it is the result of a combined research made by this company and Dow Chemical Co. of Midland, Mich.

The new product is a dry, inert compound that stops the combustion of magnesium as well as other metals such as sodium, potassium, aluminum and zinc. It also contains a material which, when heated, forms a heavy, air excluding, fire smothering vapor.

The powder is applied to the fire by spreading it with a scoop or shovel. Being nonabrasive, it may be used freely around machinery. According to the company, the usual extinguishing agents have no extinguishing effect on burning magnesium alloys. Makeshift substances such as talc, soapstone and sand are unsatisfactory. Water or any substance containing moisture increases the speed of combustion.

Subcontracting GETS THINGS DONE

Aircraft output augmented greatly by help of 131 suppliers of finished parts, 32 suppliers of castings, forgings and semifinished parts. Altogether, 475 companies regularly supply parts which take 50 cents of every sales dollar. Methods making possible this important use of outside facilities are detailed

■ NO ONE need look far these days to find cause for the present wave of subcontracting in the metalworking industry. Primarily the reason is a shortage of equipment and skilled help, created by a combination of the heaviest armament spending in the history of the world and an underpar condition of industry resulting from a long and bitter depression—and emphasized, it might be added, by a combination of the heaviest demand for mechanized military equipment on record and the shortest standard work week in the experience of the country.

Admittedly, vast strides are being made in the production of machine tool equipment, with an increase in the value of output last year of 125 per cent and an indicated gain this year of another 75 per cent. Too, much is being accomplished in training men to be reasonably proficient on certain specific operations.

But in the present emergency this is not enough. So it is that subcontracting in industry is being widely employed to perform the vital function of speeding the production of armaments through greater utilization of existing equipment and trained manpower. In many cases it brings into immediate operation facilities which would take months to provide. It is augmenting for defense work not only the supply of skilled labor, but the even more badly needed corps of experienced superintendents, supervisors and foremen.

While the present primary aim in subletting work is to add tools and skill and thus speed production, there are also other important considerations such as the desirability of avoiding fast swelling concentrations of men, with attendant difficult problems of housing and transportation, and the effects of the inevitable deflation—once the emergency is over. As a matter of fact, a letdown after the emergency appears certain in most lines, but precautions, such as the decentralization of work, will do much to cushion the effect.

Subcontractors supply enormous quantities of parts. Above, for instance, are thousands of cylinders for aircraft engines—all supplied by subcontractors. Cylinders have aluminum alloy heads, steel barrels. Heads are cast, barrels forged

Value of Sub-Letting Known

The value of subletting work in an emergency has long been recognized by military authorities and many leading industrialists. Years before the present defense program got under way, they had begun to classify plant facilities for reference when needed. Recently local banks have also been brought into the picture by authorities in Washington not only because of their close knowledge of the industries in their respective communities, but because of the financial assistance they might be able to render through existing special arrangements with government agencies.

Moreover, civic commercial organizations, such as local chambers of commerce, rotary clubs and so forth have been energetic in keeping the government procurement divisions and primary manufacturers advised as to available facilities. State organizations, both civic and governmental, also are now co-operating in this work.

All this focuses attention on the possibilities. However, the primary manufacturer usually feels he must have a first-hand knowledge of the equipment, managing personnel and reputation of the subcontractor. Then not infrequently the vendor's equipment must be supplemented by supplying certain jigs, fixtures and other equipment; sources of material must be developed; proper co-ordination of operations between primary manufacturer and subcontractor arranged; operators trained; inspection details worked out.

All this requires effort, careful planning and time. The matter of actual training itself often runs over a period of several months. Often the most difficult thing to be taught is that the specifications must be carried out to the degree indicated. Notwithstanding, the success usually achieved appears to make subcontracting well worth

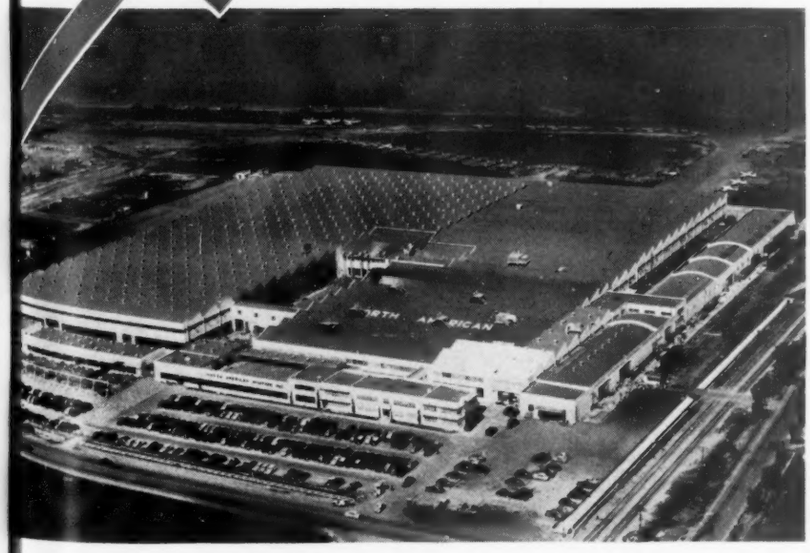
BAKER TRUCKS speed handling at *North American*

North American B-25 Twin-engine Bomber dressed in camouflage paint of the United States Army Air Corps.

Above: Baker Trucks removing a die from one of the drop-hammers with the use of a winch. Same truck quickly carries die to storage area.

Above, right: Baker Trucks picking up one of hundreds of heavy dies used in North American's drop-hammer department.

Below: Aerial view of North American Aviation's huge Inglewood, California factory. Vast areas and heavy handling operations of aircraft plants emphasize the need for Baker Trucks.



● Geared for highest efficiency in turning out fighting planes for the United States and Great Britain, the huge modern plant of North American Aviation, Inc., at Inglewood, California, uses every available means for stepping up production. Baker Trucks are called into service in the busy drop-hammer department, where they make short work of removing and installing heavy dies, carrying them rapidly to and from the outside storage area.

BAKER INDUSTRIAL TRUCK DIVISION
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Baker INDUSTRIAL TRUCKS

Inspection of parts furnished by subcontractors is an important part of the subcontracting setup. Here girl operators are shown checking finished piston pins at the Pratt & Whitney Aircraft plant

while and vitally important in the present emergency.

Particularly outstanding is the accomplishment of Pratt & Whitney Aircraft, the engine division of the United Aircraft Corp., East Hartford, Conn. This company's requirements are exacting and pressing, yet almost 50 cents of the company's sales dollar is expended for parts and production materials purchased from a long list of subcontractors all over the country.

Its experience in developing subcontractors to do a substantial portion of its machining work and manufacture of parts dates back to the inception of its business in 1925, more than 15 years ago. The purpose then was to provide for maximum production with existing plant facilities and to permit, when necessary, greater output than possible if all operations were concentrated in its own plant. The development of this policy was facilitated greatly by the location of the company in New England, an important center in the precision industry and where more than 50 per cent of the company's subcontract work is now being done.

Originally, the task of subletting work met with considerable resistance, for the future of the aircraft industry was still regarded with uncertainty by many, particularly among some of the more conservative New England companies. There were other difficulties, particularly in obtaining certain alloy steel required. Even recently, it must be remembered, aircraft requirements were relatively small and principally of the tailor-made variety, hence not attractive business.

Today Pratt & Whitney has 131 companies supplying finished parts with slightly more than one-half located in New England and the remainder at other points as far west as Illinois and Wisconsin. It also has 32 companies supplying castings, forgings and semifinished parts, more than half of these also being in New England.

Incidentally, of the 63 suppliers of finished parts outside of New England, 18 are located in New York, 12 in Michigan, 11 in New Jersey, 8 in Ohio, 5 in Pennsylvania, 4 in Illinois, 3 in Indiana and one each in Maryland and Wisconsin. Of the 14 suppliers of forgings, castings and semifinished parts outside New England, 4 are located in Michigan, 3 each in Pennsylvania and Ohio, 2 in New York and one each in New Jersey and Wisconsin. In addition there are 25 suppliers of steel products, 5 vendors of nonferrous metals, 35 tool vendors and 246 suppliers of miscellaneous items. Thus, including the 131 vendors of finished parts and 32 suppliers of forgings, castings and semifinished parts, a total of 475 companies are on the regular list.

Buys Many Completed Parts

Of course, many of these are not properly called subcontractors. Obviously, the manufacturer supplying ink or lead pencils, for instance, would not come under such classification; nor, in the opinion of some, would manufacturers of such products as spark plugs, magnetos and carburetors.

The East Hartford company buys all its forgings and castings outside as well as many parts in completed form such as piston rings, magnetos, valves, spark plugs, gaskets and the like. On the other hand, the company machines many parts from bar stock; does all of the machining on connecting rods, master rods and on many gears, cylinder heads and crankshaft parts.

Interestingly, although production at the Pratt & Whitney Aircraft plant is expanding rapidly, there are few additional subcontractors. It is evident the subcontractors also are increasing their facilities and working schedules to meet the heavier demands of the prime contractor, which since 1939 has increased its own factory space from 400,000 to 1,600,000 square feet. Another heavy expansion program is under negotiation providing for 400,000 to 500,000 square feet of additional plant capacity. Subcontractors are duly advised of proposed increases in demand so they may plan accordingly. Not infrequently, increased shipments beyond arranged schedules have been requested and met in most cases. In this, the prime contractor endeavors to co-operate fully in developing the needed additional supplies of materials and in arranging for added equipment.

Fact is, much of the purchasing of plain materials for its subcontractors is done by the Pratt & Whitney organization, particularly special steels. New equipment which subcontractors find necessary is usually financed through government aid.

Unquestionably, Pratt & Whitney could manufacture some items more cheaply themselves. Yet in general the company figures it is less costly to buy outside than to expand plant and equipment and create the necessary organization. Moreover, the present policy provides greater flexibility in changing models and designs—particularly important in meeting new requirements of the war.

While many subcontractors have increased their working forces several hundred per cent, rejections of their shipments as received at Pratt & Whitney are no greater. If the subcontractors themselves are having difficulty with increased rejections, it is not evident.

So important has become the volume of work handled through subcontractors that Pratt & Whitney has created a new post of production manager, whose sole responsibility is to supervise production of subcontractors and co-ordinate it with the company's own operations.

Up to this time much of the liaison work between the company and its subcontractors has been

(*Please turn to Page* 106)

"A GULF ENGINEER helped speed up all our machining operations"

Says this Machinery Division Foreman

Actual in-the-plant photo of a Gulf engineer discussing the machining of a yoke spindle with the machinery division foreman. This part is bored and finish turned with the help of Gulf quality lubricants on the turret lathe shown above.

"We credit his suggestions for a Substantial Increase in our Defense Output."

"WE had to bring our equipment up to capacity production practically overnight," says this machinery division foreman, "so we called in a Gulf engineer for advice. By following his recommendations we speeded up all our machining operations, which meant a substantial increase in our defense output."

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How To Save

$3 TO $5 PER TON

in erecting structural steel

Forged steel erection seats and clips employing "hook-and-eye" systems save $3 to $5 per ton in cost of fabricating and erecting structural steel by welding as compared with older methods. Wide use in many types of buildings show method excellently suited to any assembly where structural steel parts must be located and held for welding. Method is dependable and permits greatly increased erection speed because it reduces number of operations to less than half

By **VAN RENSSELAER P. SAXE**
Consulting Engineer to
J. H. Williams & Co.
Buffalo

■ THE RECENT completion of the Maryland National Guard hangar at Baltimore employing Saxe welding connections not only saved the War Department considerable erection time but also 61 tons of steel. Representing a total saving of about $7000, this is an important example of the success now attending the use of this construction method.

It was the result of work begun some years ago when arc-welded hospital buildings were being erected using temporary bolted field connections to hold the steel in place until welded. Bolts were removed after welding and re-used. It was found that such welded work cost more than similar riveted work because the expense of providing fittings and bolt holes for field erection was practically the same as for the slightly larger fittings and few more holes needed for a full riveted job. If costs were to be in line, some other method of erection was essential.

After considerable experimental work, the Saxe seat and its complementary clip were developed and found to eliminate all shop handling required to transport heavy pieces to layout man, to punches or drills, to fitting assembly, and to riveting equipment. Also, it was found that both seats and clips could be applied to the work on skids outside the shop by a layout man and welder working together, thus eliminating a great amount of handling work and time at the shop.

At conclusion of the experimental work a welded design using erection seats and clips was laid out as an alternate method of constructing the Chesapeake building at Loch Raven school in Maryland. Contractors' figures indicated this welded design would save considerable money, and subsequent construction of the building confirmed this belief. Since then the system has been used satisfactorily in many buildings and improved until today it produces an easily fabricated and erected job for assembly of steel frames at less cost than any other method.

This erection seat and clip, drop forged from SAE-1020 steel, assure positive assembly by hook-and-eye principle; support 20,000 pounds per connection easily

Can't See the Woods for the Trees: It is amazing to welding engineers going about the country to find plant after plant utilizing welding almost exclusively in manufacturing and assembling operations of their products, yet not even considering its application when occasion arises to construct a new building or plant addition. Recent visits to many plants reveal that the number using welding for assembling their products and also using welded structures could almost be counted on the fingers of two hands. Many plants occupied new buildings that could have been welded at considerable saving. It is apparent that while constant attempts are being made to use welding to lower manufacturing costs, most manufacturers are overlooking its ability to save them money in their factory or buildings. Today when so much plant capacity is being erected, this is extremely hard to understand.

Lowers Building Costs

For example, buildings are seen with columns at closely spaced intervals. These same buildings, if welded, could be built with columns twice as far apart at no greater expense to the owner, or with the same column space and saving 10 to 20 per cent on the cost. One-story long-span large open-space flood constructions were found where 20 per cent of structural costs could have been saved. These are not wild claims but can be proved by actual figures.

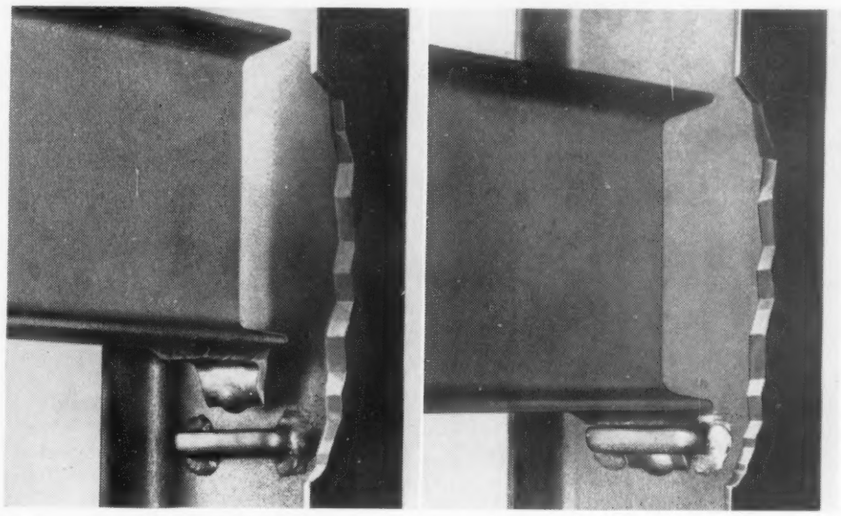
Primary reason for these lower costs is that welded trusses can save at least 20 per cent. Also, welding permits continuous beam construction which results in savings of nearly one-third. These savings can be obtained in almost any type of building, for a welded plate girder costs 15 to 20 per cent less than a girder of same capacity fabricated by conventional methods—this being cost erected.

Cost is not the only attractive feature about a welded building, for the stiffer construction affords freedom from vibration and is an important source of economy in the machinery upkeep where heavy vibration exists.

Also the newer types of roof

construction with skylights aid lighting conditions and minimize shadows. In addition, there are fewer parts, sections are smaller and of neater appearance, often completely changing interior appearance of the factory. Savings in exposed material results in lower painting costs, too.

Has Many Advantages: Under present conditions, nearly every plant is continually undergoing additions and alterations to existing structures. Here, particularly, is welding advantageous as it permits reinforcing existing floors with steel beams to support heavier machinery, permits reinforcing columns to withstand heavier loading and even additional floor levels. Often proper reinforcing will make an existing building suitable for much heavier operations than originally intended.



Left, seat and clip welded in place ready to lock the structural section together. Right, wedge action of seat and clip holds beam securely in place

Typical of what can be done with a welded structure is one plant which required an estimated 2400 tons of steel for conventional design and yet which was actually constructed with only 2000 tons as a welded structure—and at a lower price per ton for the erected steel. The saving amounted to $40,000, a yearly interest saving of approximately $2000.

Details Are Simple: Framing plans and shop detail drawings, instead of showing holes and angles, show erection seats and erection clips. After a little experience, any draftsman will find it easier to detail one of these welded jobs than one of conventional construction.

In detailing beams, erection clips are shown as the out-to-out measurement between supporting members, and erection seats are shown in the positions required to support other members in the same manner that holes are shown. Incidentally, checking of shop detail drawings is greatly simplified since there are no hole spacings to check.

In ordering material, it should be "held straight" to get best results and not allowed to come through with small variations caused by improper straightening.

All columns are milled to exact length. In detailing columns, the erection seats must be at proper elevations and the top seat used at a beam connection must be placed in a slightly lower position in relation to the top flange clip. This is done to take up variation of beam depth so the bottom seat will always be in full support of the load and at its proper level. This also makes steel setting easier, for the erector has only to guide the bottom clip into place in its seat and the top clip automatically enters its seat.

Support Large Loads: The fact that the top clip does not project all the way into its seat prevents it from developing full wedge contact and so allows a gap to exist between the seat and clip which permits side movement of the columns, thus aiding in plumbing the column when this is necessary. The seat and clip easily support loads up to 20,000 pounds per connection.

Beams can be ordered to exact length, or to plus or minus $\frac{3}{8}$-inch as is usual practice. Shops set up to furnish exact lengths economically will find the extra cost of milling will be more than saved by the smaller amount of field welding required.

When ordered plus or minus $\frac{3}{8}$-inch, occasionally the beam will come too short so a gap occurs between the web and support of more than $\frac{1}{4}$-inch, the limit of good practice. While this makes no difference in the type of connection in which web connecting angles are used, in the direct-web-weld type, the excessive clearance can be taken by first providing additional weld metal on the supporting member to which is subsequently applied the welding which supports the beam.

Another method of connecting short beams is to apply web connection angles to the beam at the shop or in the field. Either method is satisfactory.

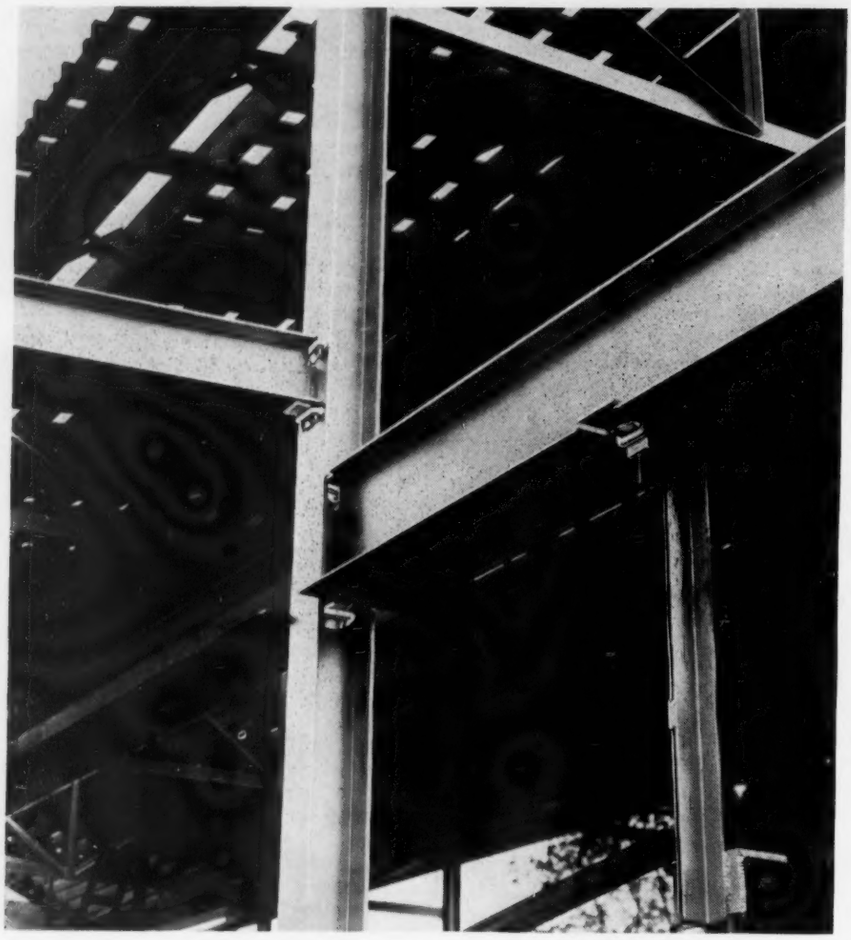
Shop Work: Use of the Saxe erection clip and seat eliminates many operations in the shop as well as in the field. In the shop, the layout man generally marks with a white line on the column itself the horizontal and center line positions at which the erection seats are required. These marks are then followed in locating seats and clips in exact position, using the center lines found on the seats and clips themselves. When in line with column center line mark they are clamped in position and tack welded, followed by complete welding—or tack welding may be eliminated.

Length gages, a steel tape and C-clamps are usually sufficient to lay out the location of seats and clips accurately. Where there is considerable duplication of connections, as when erection seats are used on the edge of truss chords, a small jig may be used to advantage, but this is about the only place where a jig has been preferred over the simpler tools mentioned.

In fabricating beams, the erection seats to support other beams are placed in the same manner as on columns. The center line found on erection clips helps to locate them in position. Layout men can use considerable judgment in locating these erection clips from the ends of the beam so the distance back from the face of the erection clip is evenly divided at each end of the beam. Thus the beam will sit evenly between the faces of the clip, making for uniform field welding at each end of the beam.

At this point if the layout man finds the beam as designed for direct web weld is so short that clearance at ends exceeds $\frac{1}{4}$-inch, then it is best to make the clearance at one end as small as possible and provide for web angle connections at the other end. Or extra weld metal may be deposited on the supporting beam as this material can be added either in the shop or in the field. However, this happens so rarely that it is a matter of little consequence, but is merely mentioned here to show correct procedure.

In laying out beams having free or wall-bearing ends, it is sensible to locate the erection clip as closely to the end of the beam as pos-



Each beam end is held in place by two seats and clips as shown here. Erection proceeds at exceptionally high speed, making important time savings possible

sible for this will assure a small clearance between the beam and supporting member, resulting in a minimum amount of field welding.

In shop welding the erection seats and clips, a 5/32-inch heavy coated welding rod is used. Larger rod will not get into the corners and give the penetration desired. The weld metal must be prevented from flowing into the seat pocket and interfering with the clip.

Thus shop fabrication is simple, erection seats and clips being laid out directly on the steel, clamped, tack welded and finish welded. By working on several main members one after another, it is possible for a welder with a helper to turn the steel over so seats and clips can be welded to main members without moving them from the original layout position.

In detail, the operation involves placing two erection seats for each beam or girder connection to a column and placing two clip angles, one on the top and one on the bottom end of each beam or girder where it connects to a column. Further, one erection seat is placed on each girder web where a beam connects to the girder, and one clip angle is placed on the bottom flange end of each beam where the beam connects to the girder.

This detail is given to show that only two different pieces are required to make up the fittings for one of these welded jobs, whereas many different pieces and hole punchings are required to make up a conventional job.

With seats and clips welded in place, shop assembly is done. It is just as simple as that.

Field Erection: Sequence of field erection is exactly like that of any other structural frame work. Columns are erected a tier at a time (a tier is usually two floors) and beams placed in position on the seats between the columns or other beams. With ordinary shop work, it will be found that the structure normally is plumb. Because seats and clips on ends of beams are worked to neat dimensions between columns, they automatically become plumb as the beams and girders are attached to them. In case any portion is not plumb, it can be plumbed by cable lines in the same manner as other steelworks. If shop errors are found during erection, it is easy to burn off an erection seat or clip and put a new one in the proper location.

Field welding should not be started until after the steel has been plumbed. In multistory work, it is customary to start welding on the beams which support the derrick when it is raised to start erection of the next tier of columns. This permits erection to keep going at top speed. Welding can be done so rapidly that no delay occurs. By the time the derrick is raised to its new position and is ready for work, sufficient welding can have been completed at such points as guy line supports, to have a structure sufficiently rigid to keep the work from moving, even if the entire tier of beams has not been welded completely.

The erection seats and clips not only act as supports for the beams, but produce the same effect as temporary field erection bolts. The erection seat will be found to provide a safe, steady beam support that will not allow the beam to wobble. It is safe to work and walk on.

Of course, all welding should be done only by properly qualified men, and all field work as well as shop work should be inspected carefully.

Field erection boils down to this: Base plates for columns are placed over anchor bolts previously placed in footings, columns are set on base plates and bolted down. Steel beams and girders are raised with a derrick to their correct position at the erection seat support on a column or beam. When the beam is slightly above the erection seat, the beam is lowered so the clip angles engage the erection seat openings as the beam is lowered into place. Thus the clip angles come to a full bearing on the seat. Top flange of the beam over the seat then is struck with a heavy hammer, driving the clip angle tightly into the erection seat so the fillet on the angle engages the edge of the erection seat, making a wedge fit.

With the beam or beams completely erected, no further work is required on them until the welder welds them to the supporting member. That's all there is to it.

With steel in place, the welder works from one beam connection to another on a ladder instead of the usual platform which is necessary to erect in older methods. It may be desirable to employ an engineer to watch the welding machine and assist the welder by seeing that the welding current is of proper value. One welder with an assistant in this manner can weld all the points about a column or beam connection in about five-fourths the time it would ordinarily take a gang of men to make the same joints by other methods.

(*Please turn to Page* 106)

PRODUCTION WELDING AT A PROFIT—

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THE success of G-E electrodes as an aid to effective, high-speed metal fabrication and repair is due to high-quality deposition that's *fast* and ***dependable!*** That's what welding operators are getting these days with G-E electrodes.

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As a further aid to cutting your welding costs, we label each 50-lb carton of mild-steel electrodes with production data: ***estimated footage obtainable*** from each carton, on typical fillets, and the ***estimated weight of metal obtainable.*** This enables you to make more accurate estimates of welding costs, of the footage available from electrode stocks, and the pounds needed for any job. No more guessing — no more shortages or overages on your welding estimates.

Special localized service on your welding requirements is available from your G-E arc welding distributor or G-E office. No obligation or cost to you for free samples or demonstration. Just phone or write. General Electric, Schenectady, New York.

Production data is available on heavily-coated, mild-steel electrodes, "all-position" types, W-20, -22, -25, -30 ($\frac{1}{8}$- to $\frac{1}{4}$-in. dia.) and "flat-position" types, W-23 and W-24 ($\frac{1}{4}$-in. to $\frac{3}{8}$-in. dia.). Data on other sizes on request.

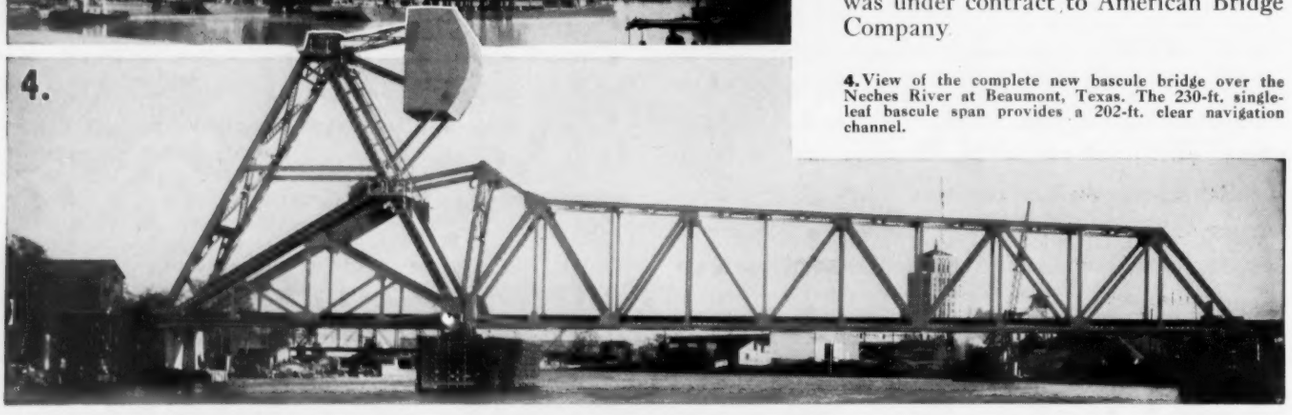
GENERAL ELECTRIC

Longest Single-Leaf Bascule now in use

1. View of the original 247-ft. swing span fabricated by American Bridge in 1918. Its central pier divides the river into 2 narrow channels. To the left of the right-end abutment is seen the newly constructed pier for supporting the river-end of the "A" frame tower of the new bascule bridge.

2. The 2 right-end panels of the old bridge have been removed and counterweights added on the top chord. Bridge now functions as a bob-tailed swing span with no interference with "A" frame erection or with rail traffic—track being carried by steel framing at the base of the tower.

3. With the completion of the tower, the bascule leaf, with machinery and counterweight, was erected in a vertical position without obstructing train movements or swinging of the bob-tailed span. View shows the new structure completed, the old swing span supported on two barges and being floated out prior to lowering of the bascule leaf. Traffic was suspended for 11 hours for this final operation. The old swing span was carefully dismantled for future re-erection at another site.



4. View of the complete new bascule bridge over the Neches River at Beaumont, Texas. The 230-ft. single-leaf bascule span provides a 202-ft. clear navigation channel.

Alignment maintained and rail and river traffic uninterrupted during construction

SEVERAL features mark the construction of the new Abt-type bascule bridge over the Neches River, at Beaumont, Texas, as an interesting example of engineering ingenuity and planning. Built for the Texas & New Orleans Railroad Company (Southern Pacific Lines), it is the longest single-leaf bascule now in use.

Designed to meet the demand for a navigation channel of 200-foot minimum width, the new bascule replaces an older 247-foot swing span which, because of its central pier, provided divided channels, each approximately 98 feet in width. It was built on the old structure's alignment, and railroad traffic was maintained throughout the construction period excepting for an eleven-hour interval after complete erection. During this interval the swing span was floated out and the bascule leaf lowered into position.

The new single-track bascule has a total length of 322 feet, comprising a 230-foot bascule span and an "A" frame counterweight tower with a base length of 92 feet. The tower is approximately 25½ feet in width, and rises 82½ feet above the piers.

The entire superstructure, ready for service, including counterweights, machinery parts, electrical equipment, housings, as well as the remodeling, removal and dismantling of the old swing span, was under contract to American Bridge Company.

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Minneapolis · New York · Philadelphia · St. Louis

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Export Company, New York

UNITED STATES STEEL

Shaping Metal Sheets

(*Continued from Page* 57)

holes. So a number of high-production drilling setups are utilized. Fig. 6 shows one of these. Typical of the production speeds possible with such an arrangement is the drilling of six hundred 3/16-inch holes through a stack of ten sheets of material in 1½ hours. As you will note in Fig. 6, pilots are used on drills to help in locating, and all drilling is done through templets.

Use Many Electric Drills

To prepare the work, the sheets are pushed up against stops on a table, templets placed on top, and the whole held down against the table by cross bars clamped to flanges at front and back of table by means of quick operating clamps. Each clamp is provided with a pad underneath to avoid marking top of the templet. The clamp is operated by a toggle and latch which holds it in position. To release the clamp, the handle is moved sideways slightly. As the handle then is moved up, the pressure on the templet is released. Then the clamp mechanism can be slid along the cross bar, releasing it from the underside of the flange so the entire bar can be removed from the table. These quick acting clamps greatly facilitate moving the braces about on the top of the work so holes can be drilled on all portions of the templet.

Although Fig. 6 shows an air-operated drill, many high-cycle electric drills also are used.

Forming now is the next operation after the pieces have been cut to the contour desired and punched or drilled for rivet holes. Figs. 7 and 8 show respectively setup and operation of forming an aileron trailing edge. Note the forming operation is done on a press brake using only a top die which carries the desired curvature. The lower die consists of a rubber cushion into which the work is forced. In operation the sheet shown in Fig. 7 is positioned by means of three pins in the upper die. As the ram descends, it forces the work into the rubber pad, and the piece takes the desired bend. This method avoids necessity of preparing a lower die as well and eliminates aligning dies, thus simplifying work in setting up the machine as well as reducing the number of dies required.

This matter of dies is something which must be watched as many dies will not be called upon to produce more than several thousand pieces before the model design is changed. In fact, some produce only a few hundred. Economy demands utilizing every device to keep down die costs. Some other methods in addition to that just pointed out are detailed a little further on in this article.

Press brakes are utilized for many forming and bending operations. A typical setup employs V-die for producing a right-angle bend. Stops on the back side of the dies position the work accurately.

A wide variety of complicated two-dimension bends are made on press brakes. Fig. 9 shows a closeup of one of these.

A large number of eccentric presses is employed for three-dimension forming operations, with the builtup wooden dies made of wood and faced with metal at the points where wear is experienced. For the few hundred or thousand parts which they will be called upon to produce, they are sufficiently accurate.

These combination dies are mostly wood, faced with steel in thicknesses

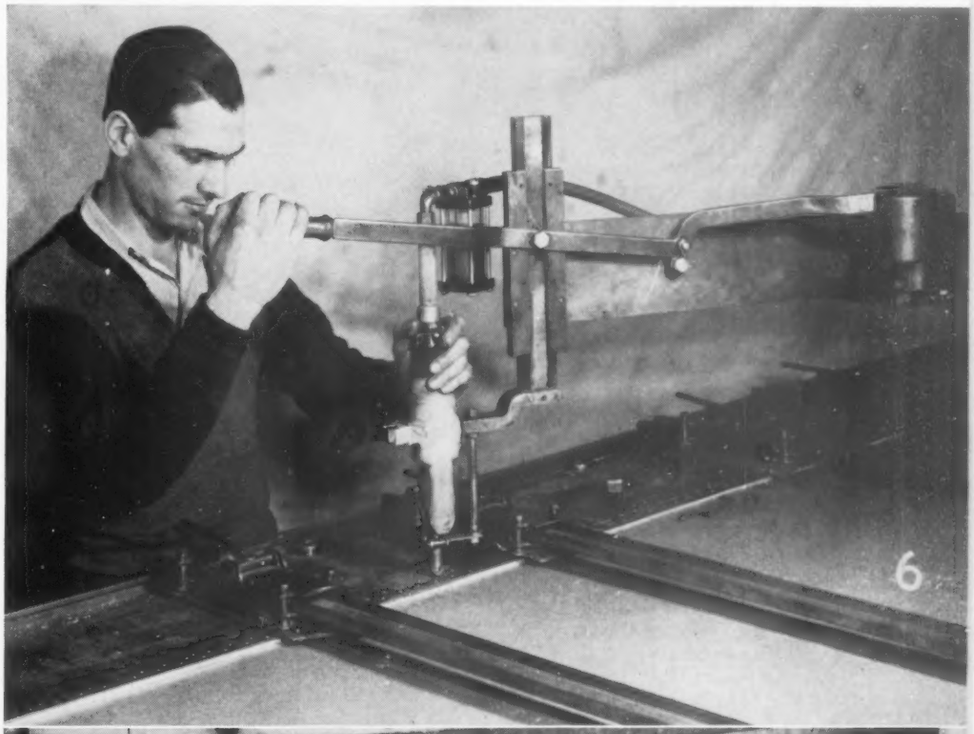


Fig. 6—A high-production setup like this permits drilling six hundred 3/16-inch holes in 12 thicknesses of sheet aluminum in 1½ hours. Note speed clamps locking into flange of front table rail

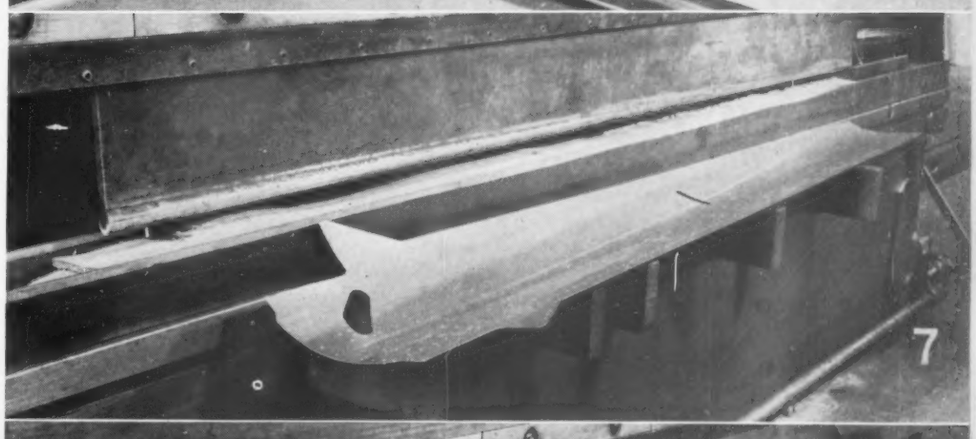
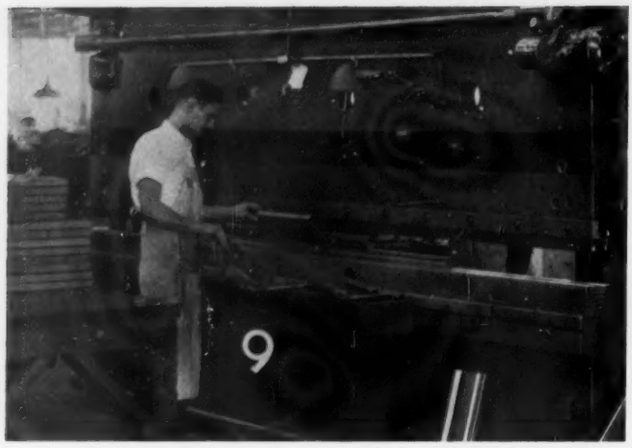


Fig. 7—For this forming operation, only a male die is used, a rubber pad serves as the lower die

Fig. 8—After part is located under ram by means of pins, it is forced down into the rubber bed, producing the shape desired. This method eliminates the need for a lower die



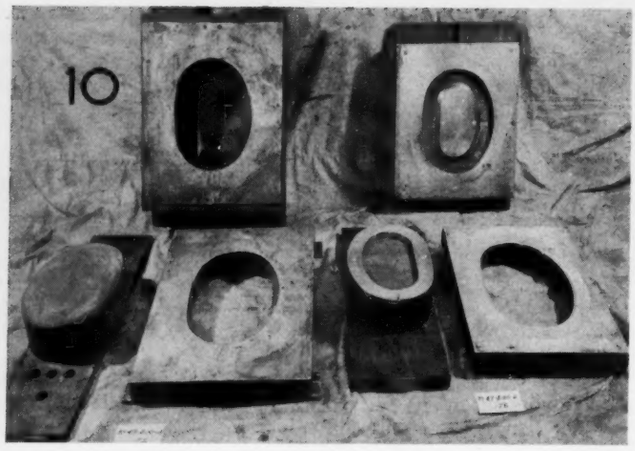


Fig. 9—This is a 12-foot Cincinnati press brake. Note the number of bends performed in a succession of strokes with this simple set of dies

Fig. 10—Set of typical combination wood and steel dies for drawing an oil tank

varying from a thin sheet up to ½-inch low-carbon steel plate. The steel is not hardened, thus eliminating cost of heat treating. Such dies are ample for producing up to several thousand pieces, and tolerances within plus or minus 0.015-inch are met easily. Fig. 10 shows a number of combination wood and steel dies for drawing ends to make an oil tank.

In Fig. 11 are a number of wood and steel dies for forming various odd-shaped pieces. Utilizing built up wood and steel combination dies in this manner affords a most important means of keeping down die costs. By avoiding the necessity of heat treating, processing costs are still further reduced.

Fig. 12 shows typical forms, patterns and dies for drop hammer work. Since production of a good many parts lends itself to this type of operation, dies for drop hammer work also must be made. Practically all these are cast from a special zinc alloy developed at Curtiss-Wright particularly for this work. At the lower left is a sheet metal part produced from the dies made from the small pattern immediately alongside. In making most of these cast dies, the projecting or male portion first is made from the wooden pattern, the lower or female section being cast using the other half of the die as its pattern. This greatly simplifies diemaking and helps keep down the cost.

Another method which permits important economies in die costs is the Guerin process. As is well known, this utilizes only one die, male or female, is placed on the lower part of the press. The sheet to be worked then is placed over the die and rubber cushions placed on top of this. When the hydraulic press (required for proper control) is operated, the pressure built up by the rubber forces the metal to assume the shape desired and also blanks out portions where the work is forced against the sharp edges of the die below. This is a fast, economical method of making a large number of odd-shaped parts, of forming three-dimension curves as well as blanking—all being done simultaneously.

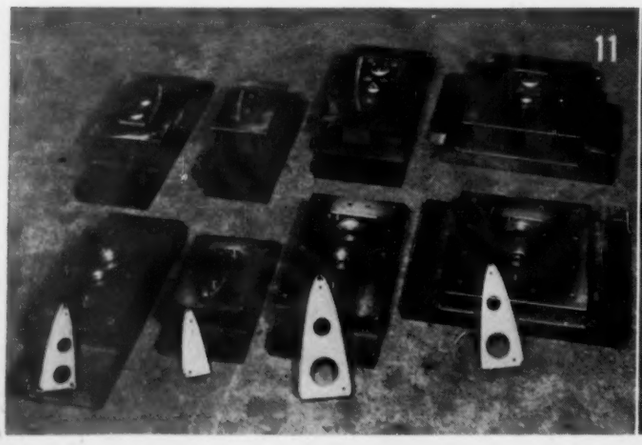
As shown in Fig. 13, to get the most output from such a press, work is fed in successively from three sides. Dies are grouped on a plate held on a carrier and the whole slid in and out underneath the press in sequence with the carriers from the other two stations. Since it takes a much longer period of time to remove the formed parts from the dies than it does to form them in the press, such an arrangement is important if anywhere near the maximum output of the press is to be obtained.

In addition to the press shown in Fig. 13, there is another and larger unit employed for this work. This 2500-ton hydraulic press has a maximum working area of 48 x 64 inches. This also is provided with three loading and unloading stations for handling dies and feeding them into the press. Two operators are employed at each of the three stations for the loading and unloading work, while a seventh man operates the press ram.

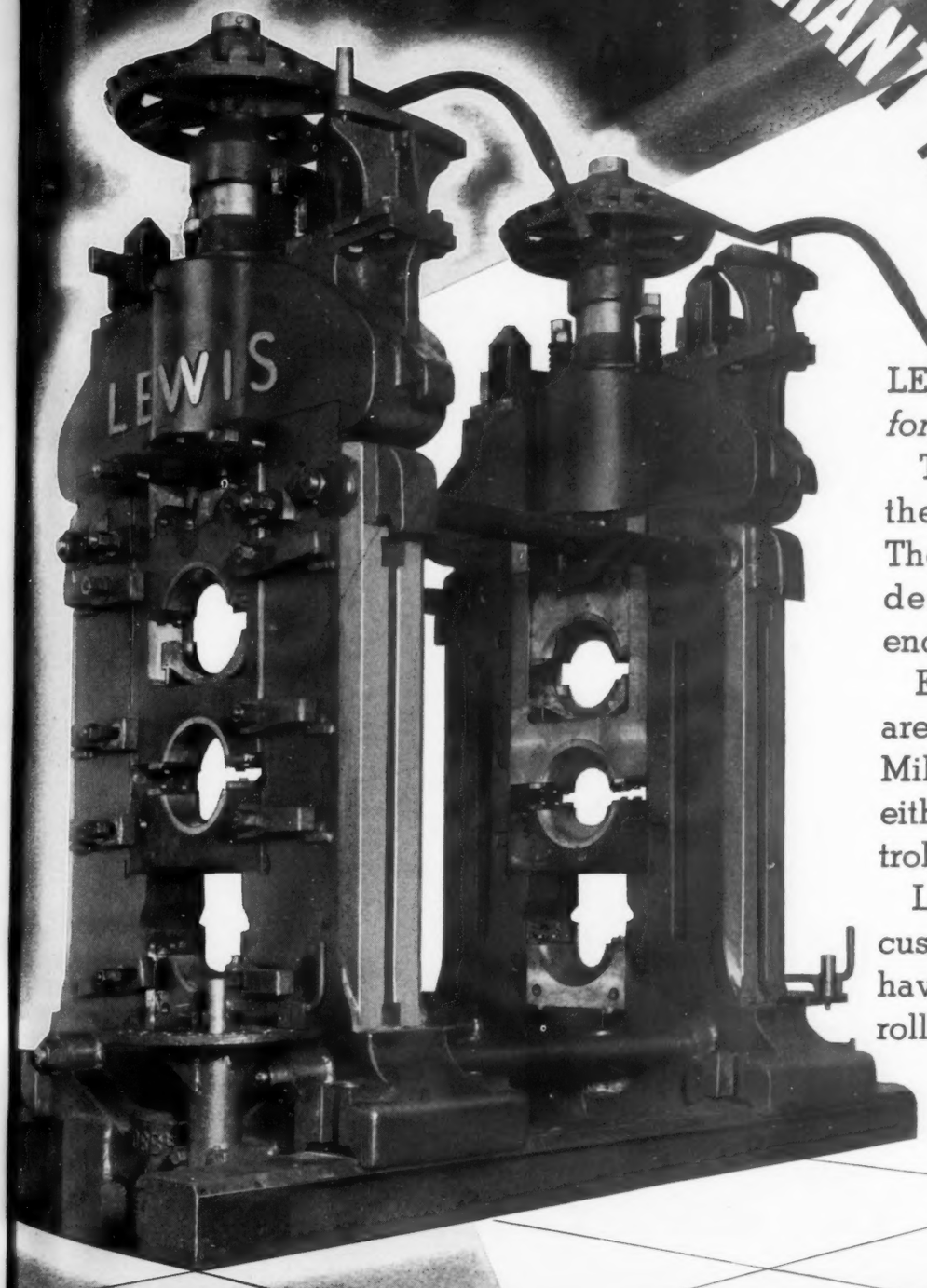
For large forming operations, zinc alloy die blocks cast to shape are used with a hydraulic press in addition to use of builtup wood and steel dies. Of course zinc dies as used in

Fig. 11—Typical wood-and-steel dies for forming operations

Fig. 12—Forms, patterns and dies for drop hammer work



LEWIS RUGGED MERCHANT MILLS



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DIVISION OF BLAW-KNOX CO.
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Fig. 13—Hydraulic press utilizes three load-unload stations to obtain maximum output

Fig. 14—Assembly fixture and dies for blanking and forming an instrument panel cover

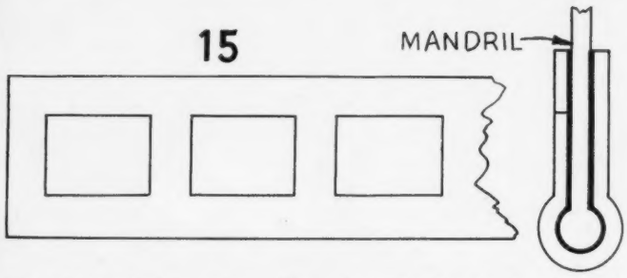

Fig. 15—Simple blanking and forming operations produce continuous hinges

the Guerin process need no upper half, the upper portion of the die being a rubber pad. In any case, working with rubber pads requires extremely close control of pressures, which must be brought up to the particular value best suited to form the particular part. Excessive pressure will cause the sheet to crack at radii instead of forming as desired. On the other hand, too low a pressure will not produce the desired forming action and will not cut the material when blanking.

In making zinc alloy dies, first a wood pattern is constructed like that shown at lower right, Fig. 12. Around this plaster of Paris is poured to form a pattern. Then into this is cast the zinc alloy composition material. This forms the upper half or male portion of the die. The lower half is produced by casting the material around this, using the upper half as a pattern.

Perhaps typical of the die economies this method makes possible are those in connection with forming the instrument panel protective cover shown in Fig. 14. The instruments themselves are mounted on a separate panel back of this, the cover or protective panel being placed a fraction of an inch in front of this to protect the faces of the instruments.

The protective panel itself is blanked using the die at the upper right in Fig. 14. When the work is forced by the rubber against the sharp edges of this die, not only is the circumference blanked but also the holes through which the various instruments are viewed. Using a rubber pad as the upper portion of the die eliminates the necessity of making and fitting a complicated 2-part blanking die. Similarly, to form the flanges on the inside of the holes and around the periphery of the cover, a second die, shown at the lower left, is used. Here the bulges produced at a number of points in the blanking die are employed to locate the panel from this forming die. As the rubber is forced down over the panel, the inner edges of the holes are flanged as desired. No upper or male die is required.

Upper left Fig. 14 also shows the assembly fixtures used in joining the cover to the instrument panel itself and also for mounting various brackets and other accessories. The cover is hinged to the instrument panel at the lower edge. Note the positioning devices and hinges.

One of the interesting production operations is the making of continuous hinges. These are made in any length up to 18 inches by a simple 2-stage method. In the first stage, the holes, showed in Fig. 15 are blanked. In the next operation, the blank is wrapped around a mandrel which leaves a space for the connecting pin. The hinge halves are identical, and to make a completed hinge, two sections need only to be connected by a pin. The material employed is 1/16-inch Alclad.

To avoid distortion, most work is formed after it is heat treated to give the physical characteristics desired. For details of heat treating procedure employed at this plant, see STEEL, June 24, 1940, p. 44. In a few instances, however, it is desirable to heat treat after forming. The exact procedure varies, of course, depending on the material.

Test Kit Tells Story Of New Industrial Oil

■ Because many purchasers of industrial lubricants lack time and equipment to make extended performance tests on machine oil, L. R. Kerns Co. Inc., 2803 East Ninety-fifth street, Chicago, is offering a simple test kit with which the adhesive qualities of its product, Cling oil, can be quickly demonstrated on any executive's desk.

The kit consists of an easel on which are mounted twin tubes, one of standard mineral oil and one of an equal grade of Cling oil. When these tubes are punctured, the relatively slow drainage of oil effectively shows the greater coverage and adherence of the product.

The new product is a clear polymerized, adhesive oil of high lubricity. Viscosities are obtained through chemical treatment; no oxidizing elements are added. It has passed tests on such heavy machinery as steel mill cranes and bearings and is said to stay efficient 3 to 10 times longer than other oils.

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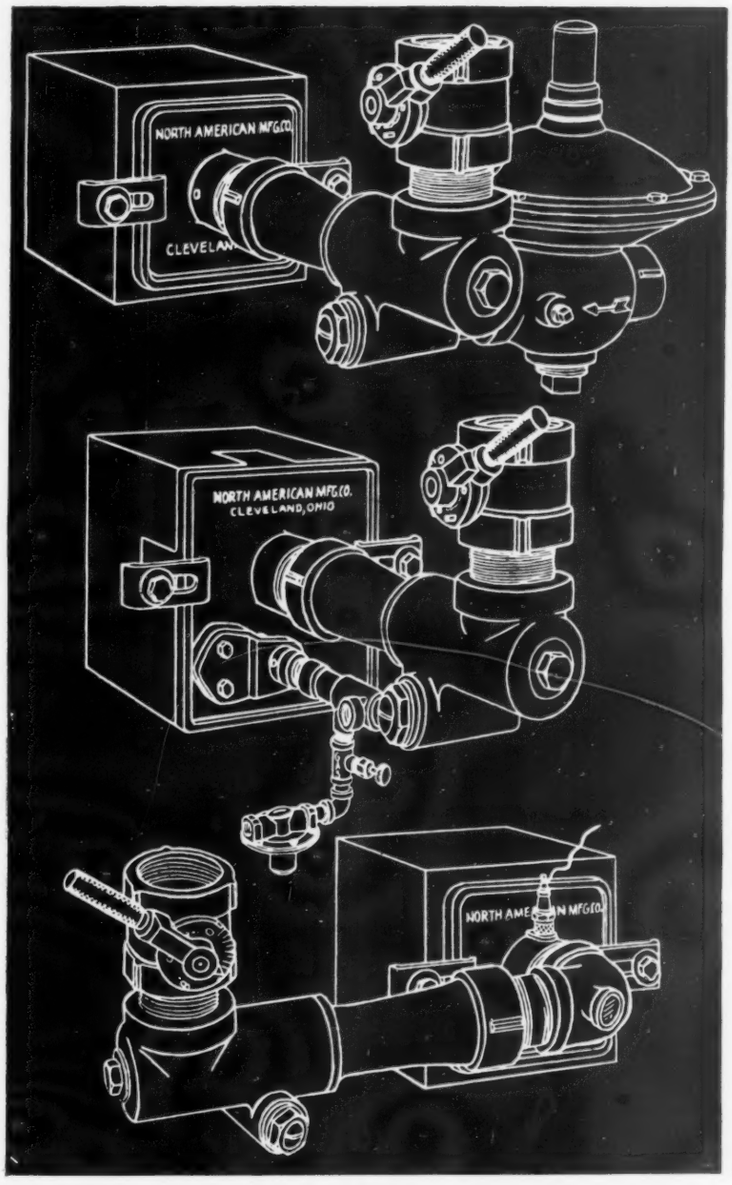
for LARGE TURN-DOWN
with INDIVIDUAL CONTROL



- HAND IGNITION
- GAS IGNITION
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NORTH AMERICAN *for* COMBUSTION

MANUFACTURING COMPANY · · · · CLEVELAND, OHIO

Industrial Equipment

All-Purpose Lift Truck

■ Towmotor Co., 1228 East 152nd street, Cleveland, has introduced a model LT-44 all purpose lift truck capable of lifting 4000 pounds at 15 inches from the carriage. It has a 44-inch wheelbase, with a turning radius of only 72 inches, and provides a range of lifting power and maneuverability sought in many fields because of overcrowded quarters.

The overall width of the truck is

35 inches and overall length (without forks) 74 inches. It is equipped with low, medium and high telescopic lifts up to 132 inches. Also available, in addition to standard load carrying forks, are interchangeable attachments for special purposes; rams, scoops, flat plates, special loading devices. Powered by a 27½-horsepower 4-cylinder gas engine, equipped with degasser and governor, the unit travels at speeds from 1 to 10 miles an hour with two speeds forward and two in reverse. Because of its hydraulic lifting and tilting system, the unit will lift and stack its rated load accurately, to heights of 7, 9 and 11 feet, at the rate of approximately 40 feet per minute. The truck's entire motor assembly and battery are instantly accessible by lifting the driver's seat. An especially designed transmission case permits removal of air ventilated clutch plate, without disturbing motor or transmission. The front (driving) axle housing is an integral part of the frame. Upholstered seat for the operator is at the center of the machine and controls are located well forward.

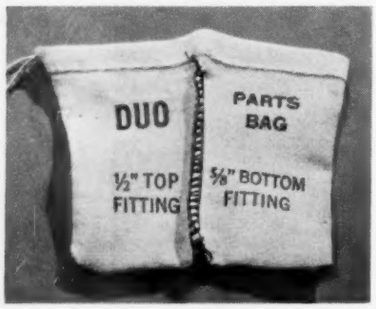
Fluorescent Unit

■ Hygrade Sylvania Corp., Salem, Mass., has introduced a new F-235 industrial fluorescent unit designed to throw large quantities of light to aid working efficiency. Coming complete with two of the new 100-watt fluorescent lamps, it gives a lumen

output of over 8400. Its reflector is easily demountable. As working parts are carried in the housing, the reflector carries only its own weight. A new latch assembly connects the reflector top with the housing. The lighting unit comes equipped with Mirastats, which insure positive starting and restarting. The whole unit is completely wired.

Cotton Parts Bag

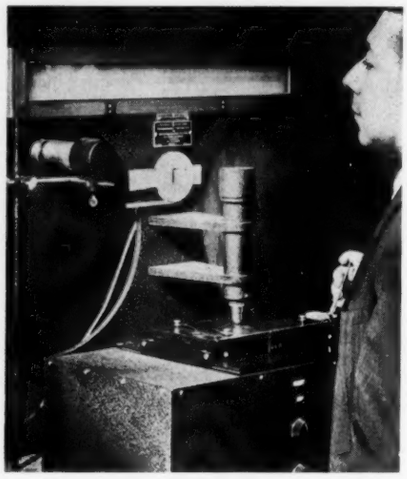
■ Ames Bag Machine Co., 1991 East Sixty-sixth street, Cleveland, has developed a new type of cotton parts bag for industrial use. Available with two or more compartments sewed into the cloth, it is for use where several parts of any kind must be shipped together but with some protecting wall between them. The bag can be used for shipping small, polished parts by airmail or for shipping bearings, springs, pump and compressor parts, small gears, nuts and bolts and the like. It can



be made in any size or shape, with any number of compartments. It comes in three general types—as a "mailing bag" with drawstrings and an address tag, "parts bag" with only drawstrings, and as an "envelope bag" with an envelope sewed into one of its seams so that first class mail may be sent along. Bags are available with company names, sizes of parts, assembly instructions, or any other desired information already printed on them.

Photometer

■ General Electric Co., Schenectady, N. Y., has developed a new photometer designed to provide a rapid and precise means of studying spectrographic plates. It is particularly useful in the control of the manufacture of alloys for turbines and generators, and all kinds of castings. The instrument enlarges the spectral lines approximately 20 times and provides a means of determining their intensities by measuring the light passing through them to a photoelectric cell. From these data, the concentration of the constituents of the alloy is determined. Optical parts remain fixed after final adjustment and require no additional movement for focus. Focusing of the

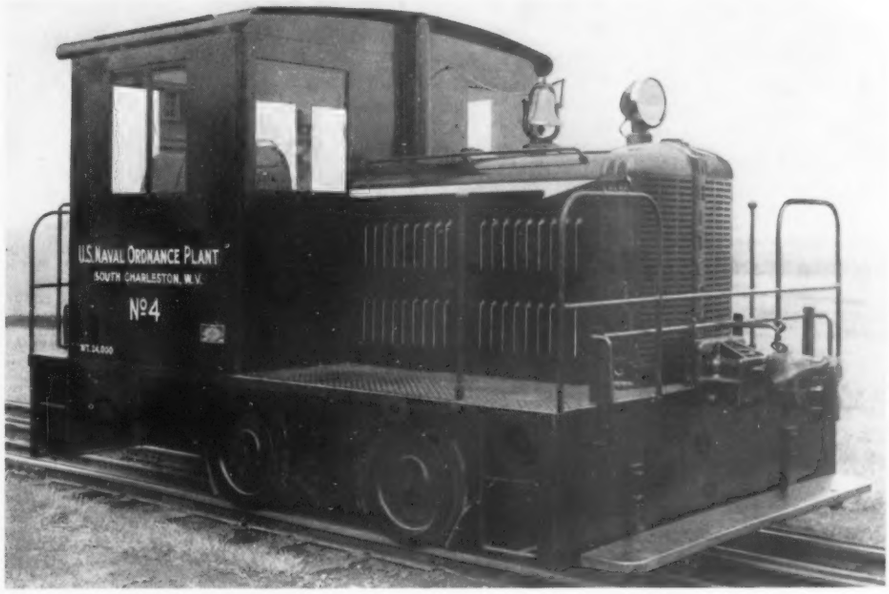


spectral lines upon the screen is accomplished by moving the spectrographic plate with respect to the condenser and objective. The plate is mounted horizontally and all of the light-control devices and scales are immediately in front of the operator. The location of the mechanical stage, screen and galvanometer scale enables the operator to see and make all adjustments from one position. The equipment is arranged to operate on a 6-vole supply of either direct or regulated alternating current.

Distribution Box

■ Ohio Brass Co., Mansfield, O., announces a new type GM gas-proof multiple distribution box bearing the approval plate of the United States Bureau of Mines for use in permissible working areas. It provides a safe and convenient means of connecting and disconnecting face circuits to conveyors, blowers, drills, hoists, cutting and loading machines. It consists of a gas-tight compartment containing a double pole dis-

Whitcomb...
LOCOMOTIVES



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Whether you are switching standard freight cars or hauling materials, you want abundant, easily-controlled power that operates with economy. Whitcomb locomotives have been making low-cost haulage records in scores of industries for over thirty-five years where the highest efficiency and economy are paramount requirements. Their long-life construction has kept maintenance costs down to a minimum.

These high standards of workmanship and design account for the reputation Whitcomb has established in the locomotive field. Today's models are built to stand up under long hours of continuous service demanded by the National Defense Program, working side by side with management and labor in speeding up production. If you want to be sure your materials are moved on time, put the job in charge of a Whitcomb.

DIESEL or GASOLINE POWER — MECHANICAL, HYDRAULIC, or ELECTRIC DRIVE

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THE WHITCOMB LOCOMOTIVE CO.

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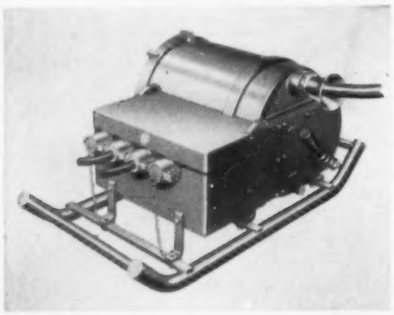
Subsidiary of THE BALDWIN LOCOMOTIVE WORKS

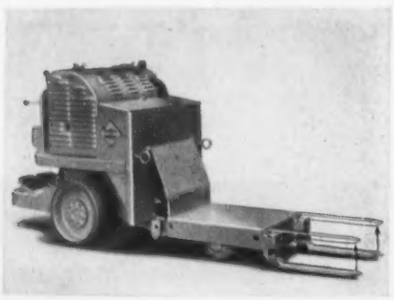
connect switch and a fuse panel, and a plug compartment containing four 3-conductor rubber plugs. The lid of the plug compartment, as well as the screw cover of the gas-tight compartment, is inter-locked with the switch, making it impossible to remove a plug or change a fuse with the power on. When the cover is



off the switch is in open position and is inoperative. The switch handle and the rubber plug bodies are completely insulated. Entrance clamps grip each outgoing circuit so that strain is not transferred to the plug connection itself. These clamps conveniently lift from their position in the case when plugs are removed from receptacles. Two additional entrance clamps without openings are provided so that dust and dirt cannot enter the plug compartment when entrances are not in use. The cover of the gas-tight compartment is screwed to the body by means of standard V-threads, confining any possible explosion to the interior of the case. The device is mounted on a skid of welded tubular construction. Overall height of the distribution box is 18½ inches, the length is 41¼ inches and the width is 25 inches.

Industrial Truck

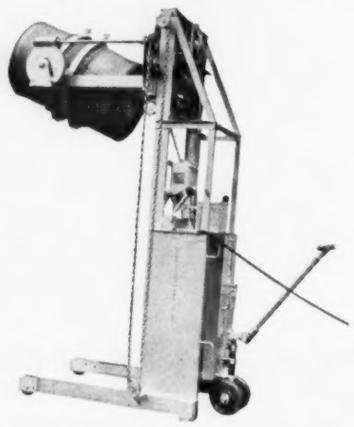
■ Elwell-Parker Electric Co., 4205 St. Clair avenue, Cleveland, announces a low-lift power industrial truck equipped with a special platform and removable forks. These 30-inch forks enable the truck to lift and transport loaded pallets from floor level. When inverted they will



pick up and transport long skid loads on the truck platform. The latter is 10¾ inches high in low position and elevates to a height of 16½ inches. Both the usefulness and appearance of this truck have been advanced by mechanical improvements. It is operated by storage battery. Dynamic braking can be incorporated for ramp operation. Raising and lowering of the platform are effected through an independent motor and screw ram. The lift jack has but 3 moving parts. A slip clutch protects the motor in case of overload.

Drum-Dumping Stacker

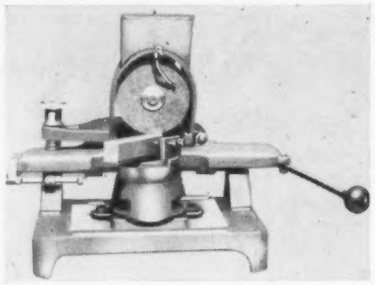
■ Lewis-Shepard Sales Corp., 245 Walnut street, Watertown, Mass., announces an improved type of drum-dumping stacker for handling the dumping of drums, barrels and other liquid or dry material containers. It permits control of the dumping operation by the operator from the floor, eliminating standing on boxes and improvised platforms. A self-locking worm makes it pos-



sible to hold the drum instantly for as long as desired—at any position. Control from the floor also permits the operator to reverse the tilt of the drum or barrel to slow down or stop the flow of material from the container.

Chip Breaker Grinder

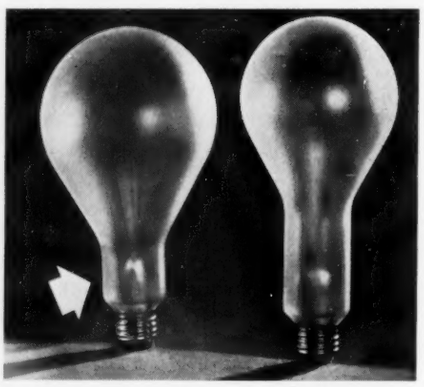
■ Drafto Co., 253 Walnut street, Cochranton, Pa., announces a new model A Drafto chip breaker grinder for grinding chip breaker grooves in carbide metal cutting tools. It is designed to simplify correct tool adjustment to any angle necessary for accurate grinding. A vise with dual locking feature, mounted on machine base, permits setting of tool to any angle required. When correct tool adjustment is obtained, stops may be set, locking the vise, but permitting tool to be removed for final inspection. Tool can then be replaced for grinding. The grinding operation is performed by a diamond cutting wheel, mounted directly on the shaft of an electrically driven ¼-horsepower 110-volt 60-cycle 3450-revolution per minute motor. Motor is mounted directly on an actuating slide, and when in operation is moved horizontally across the machine. The horizontal motion of the arm, shown at right of machine, carries the diamond wheel across the face of the tool, grooving the tip. Depth of cut is de-



termined by turning the knob set on the motor hinge bracket, shown at left side. A tank for holding kerosine is mounted directly above the diamond wheel guard, and is applied by means of a tube enclosing a wick.

Vibration Service Lamp

■ Wabash Appliance Corp., 335 Carroll street, Brooklyn, N. Y., announces a new type of vibration service lamp construction of which protects the filament from vibration and jar. It is designed for industrial and commercial use where high frequency vibration set up by motors and machinery in constant use, tend to weaken the average bulb filament. In appearance it has the same overall length as an ordinary bulb, as illustrated, but it is made in a larger oversize bulb of wider diameter to increase the convectivity of the heated argon and

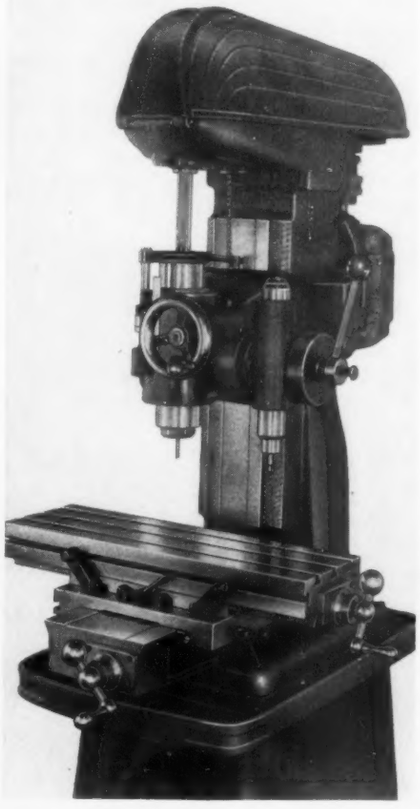


nitrogen gases inside the bulb. The filament of the lamp is cushioned against shock and concussion of vibration by four molybdenum pigtail springs welded to six flexible filament supports. The entire stem unit has been shortened and made flexible. To increase lighting efficiency a nickel neck reflector disk welded to a seventh support serves to reflect light away from the neck of the bulb, while a center piece of mica insulates the wire supports

from the disk and helps keep heat away from the base. The lamp is made in the 100, 150 and 200 watt sizes in five separate low voltages from 110 to 130 volts, and in four separate high voltages from 200 to 250 volts.

Profiling Attachment

■ Machinery Mfg. Co., 1915 East Fifty-first street, Vernon, Los Angeles, has introduced a new profiling attachment for its vertical mill and jig borer, the use of which provides a tool for duplicating a wide variety of cavity mold work such as die casting dies, plastic molds, bakelite molds, small drop forging dies and forming dies. Spindle and quill of the unit are heat-treated and ground. The rack is cut integral with the quill. Shanks to fit this



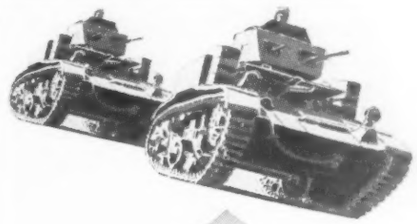
taper can be easily made to suit the requirements of the work to be done. Distance between center of the profiler spindle and the center of the machine spindle is 6 inches. The profiler spindle has a vertical adjustment of 1-inch, independent of the machine spindle. To compensate for the weight of the extra spindle and eliminate backlash, the unit is equipped with a fully enclosed preloaded spring which aids the lifting action of the machine counterweight. The tension of this spring can be varied by rotating the spring housing. Construction of the sliding head of the attachment is such that it can be easily and quickly mounted by engaging the jaws of a multijaw coupling. It is then fastened firmly to the sliding head by four cap screws. The machine's hand-lever is attached to the right side of the profiler. In this position, it actuates both the profiler and the machine quill.

Rectifier Control

■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has placed on the market a new rectifier control for use in mining service. It is manually operated but is arranged so that certain features, such as automatic closing of the cathode breaker, may be added. Interlocks also are provided for the addition of a second unit.

Equipped with overcurrent and undervoltage trips, the breakers have standard ratings from 150 to 600 kilowatts at both 275 and 550 volts, direct current. The primary alternating current protective and operating unit contains a 25,000 kilovolt ampere oil circuit breaker, a set of three, single pole, group operated disconnecting switches, and a set of current transformers.

The direct-current switching equipment included in the basic gear consists of indicating instruments



KEEP 'EM ROLLING WITH PENOLA!

● The most vital element in America's great Defense Program is STEEL! Four-high and continuous hot strip mills are being called upon for *maximum output.* That means *no shutdowns* . . . no delays due to friction damage!

With steel temperatures up to 2,600° F. and roll neck pressures exceeding one million pounds, you've *got* to be sure of your lubricants to get today's rush orders out on scheduled time! Most steel men now, as always, depend on Penola greases because they're made to stand up under conditions far tougher than any found in actual mill operation. That's a *real* safety margin!

More friction-fighting Penola greases are produced and sold today than any other make in the world. Penola's expert engineers stand ready at any time to aid you solve your lubricating problems, cut your overhead and keep metal-to-metal contact from ruining your costly gears and bearings. *Call on us today!*

PENOLA LUBRICANTS

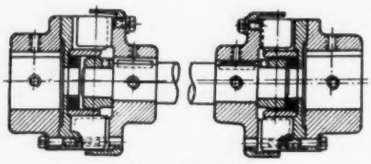
Penola Inc., Pittsburgh, Pa.
(Formerly Pennsylvania Lubricating Co.)
New York • Chicago • Detroit • St. Louis

LUBRICANTS FOR THE STEEL INDUSTRY SINCE 1885

and a manually operated cathode breaker. A multipole anode breaker is substituted for use with the "sealed off" type rectifiers and may also be used for the primary and direct-current breakers with the "pumped-type" units.

Floating-Shaft Coupling

■ Lovejoy Flexible Coupling Co., 2009 West Lake street, Chicago, has introduced a new L-R type HKQ floating-shaft flexible coupling which is applicable to either horizontal or vertical drives, and is recommended for the longer distance drives where the space between the driver and driven units cannot be successfully handled by standard couplings; and especially where there is excessive misalignment. The floating shaft of the unit is supported in fixed bearings, entirely independent of the power-transmitting elements. With this construction, the concentricity of the ends of the fixed shafts is permanently assured, thus entirely eliminating whipping of the ends of the shaft at any speed. A feature of the coupling is the speed with which it can be disassembled. The operation requires merely the reversal of three to five driving bolts. This automatically pulls the coupling bodies away from their adapters, creating a gap which permits the collapsed center assembly to be lifted out. Chatter is prevented by cushions, and free oscillation of the floating shaft—in upright as well as horizontal applications—is assured. Either of the coupling bodies mounted on the fixed shafts may be used as a sheave, or part of a sheave, for V-belt drive if desired. Three types of cushions are used: Metalflex—a long wearing brake lining material, used where heavy loads develop; leather load cushions of oak-tanned belting leather, for use on sustained loads with infrequent or no cyclic variation; and multiflex cushions—a vulcanized duck and rubber material for fluctuating loads. These load cushions are held in position by a steel retaining collar. Couplings come in standard sizes, with bores from 1½ to 8½ inches for various distances between fixed shafts and for handling extreme misalignment.



OPERATING ASSEMBLY

Transparent Gloves

■ Resistoflex Corp., Belleville, N. J., has developed PVA transparent gloves to protect men working in the vicinity of oils and solvents. Containing no sulphur, the gloves do not tarnish metal surfaces. Inspectors can use them to advantage in handling finely polished metallic surfaces—ball bearings, aircraft parts, etc. The glove material provides high resistance to tearing and abrasion, and is not affected by such solvents as oil, gasoline, or

HOLTITE-Phillips
Recessed Head
SCREWS & BOLTS
are as Time-Saving and Efficient as a Zipper

Assembling time reduced to 50% and more . . . spoilage and injuries eliminated! These are the highly profitable features that have made HOLTITE-Phillips screws, bolts and allied fastenings the choice of progressive manufacturers who have adopted faster driving methods to speed deliveries and cut costs. • • Regular HOLTITE products, and Specials, offer every user an unlimited range of fastenings that can be profitably used in the assembly of practically every manufactured product.

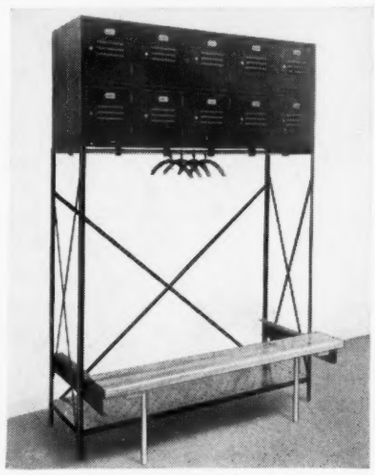
CONTINENTAL SCREW COMPANY

New Bedford, Mass., Warehouses at Detroit and Chattanooga

other commonly used materials. More important, it is unaffected by extremely active solvents such as benzol, carbon disulphide and the chlorinated hydrocarbons. While the gloves are not as flexible as rubber or synthetic rubber gloves they are sufficiently flexible to afford unrestricted movement of the fingers. Also, they do not require repeated washing. If used in contact with paints and lacquers, or if soiled or greasy, they can easily be cleaned in the available lacquer thinner, or in turpentine, carbon tetrachloride, gasoline. They are available in sizes 8, 9, 10 and 11—the three smaller sizes being produced in 10½ and 14-inch lengths, while the larger size, size 11, is made in 10½, 14 and 18-inch lengths.

Steel Lockers

■ Penn Metal Corp. of Pennsylvania, 36 Oregon street, Philadelphia, has introduced steel lockers which provide complete facilities for ten persons in half the floor space ordinarily required. Illustrated is a group of these known as the Penn-Kelsey unit. Each has an open coat space 56½ inches high with the coat hangers permanently attached to the rod. The rest of the unit consists of a perforated metal shoe rack at bottom, a wooden seat, 8½ inches wide and 18 inches above the floor—attached to the frame, and ten private locked compartments, each of which is 12 inches wide, 18 inches deep and 12½ inches high. Doors are flanged on all sides and embody three ventilating louvres. Optional locking arrangements are a flat lock with bevel spring-bolt or dead bolt, a spring-bolt combination lock or a padlock. Overall size of each unit is 60 inches wide, 18 inches deep and 87 inches high.



Sleeve Protectors

■ Protex Products, Jersey City, N. J., has placed on the market a transparent sleeve protector for "white collar" workers who must occasionally work around dusty files or machinery of any kind. Made of Goodyear's Pliofilm, the protector may be kept clean with a damp cloth and will last indefinitely.

It is noninflammable, waterproof, resistant to mild acid solutions and unaffected by oil or grease.

Portable Floor Fan

■ Ilg Electric Ventilating Co., 2850 North Crawford avenue, Chicago, announces a new 36-inch heavy-duty portable floor fan which hurls a tremendous blast of air in a straight line. Self-contained and completely equipped, it is especially valuable in "man cooling" capacities. Because of a cast-iron base of extra-heavy construction, the fan has a very low center of balance. It can be safely moved on a scoop truck, and a hook also is provided so that it can be moved by a crane if desired. A starting switch completes the equipment on the fan.

The propeller is of the 4-blade type, of one-piece metal construction, keyed to the motor shaft. Heavy steel mesh guards cover the fan in front and back. The 36-inch heavy-duty model weighs 675 pounds, and attains a speed of 1140 revolutions per minute.

AMCO'S part in the preparedness program
Over 100 AMCO PIT FURNACES installed, on order or under construction, total annual heating capacity over 8,000,000 tons
Gun Forging Furnaces
AMCO-designed Pulverized Coal Systems
Gun Annealing Furnaces
Rotary Hearth Furnaces
Continuous Rail Re-Heating Furnaces
In these times of heavy demands on Industry, AMCO'S experienced engineers can help speed production and lower cost with specially-designed Furnace Equipment to meet your individual requirements.
Continuous Bloom Heating Furnaces
The AMSLER-MORTON COMPANY
FULTON BUILDING • PITTSBURGH, PA.

ADVERTISING PAGES REMOVED

CAKE
"RAISING"
PROBLEM SOLVED

In this bakery, cakes were mixed and baked on the first floor, iced and decorated on the second. It wasn't the kind of cake-raising problem mother used to worry about—but a headache just the same.

Lack of room forced transport of the cakes while still hot. Since hot, delicate cakes fall if jarred, shocks incurred in wheeling racks up a ramp were causing excessive product spoilage.

By adapting an inexpensive, smooth operating Reading Electric Hoist to operate a light elevator, the problem was solved and a safety hazard eliminated in the bargain.

Flexible Reading equipment can be easily adapted to meet your unusual materials handling problems. May we prove it?

READING CHAIN & BLOCK CORP.
DEPT. 36 READING, PA.

READING
Chain Hoists, Electric Hoists,
Cranes and Monorails

Sub-Contracting

(*Concluded from Page* 86)

carried on by members of the management, engineers and specialized workmen, interrupting their regular duties. Now the production manager with possibly four assistants will relieve them of the load. Supplying material to subcontractors will continue in the hands of the Pratt & Whitney purchasing department, co-operating with the production manager's office.

Inspection of subcontract work by Pratt & Whitney falls generally into either one of two classes of procedure. One calls for sample inspection at the vendor's plant, with inspection being made at random. When this is done all parts are given a thorough inspection upon arrival at East Hartford. The other calls for inspection of every part by Pratt & Whitney men at the point of production. In this case no inspection is made at East Hartford.

Considerable inspection work at East Hartford is done by women, there probably being 700 or 800. This, in fact, is the only type of shop work they are permitted to do.

In addition to extensive subcontracting and expansion of facilities at East Hartford, Pratt & Whitney Aircraft has licensed the Ford Motor Co. and the Buick division of the General Motors Corp. to build Pratt & Whitney engines and both these companies are now building and equipping plants for this production.

The two other divisions of the United Aircraft Corp. — Hamilton Standard Propellers and Vought-Sikorsky Aircraft—also do considerable subcontracting. All three divisions subcontract independently.

Erecting Steel

(*Concluded from Page* 92)

Cuts Operations In Half: Comparison of the operations required in shop work with this method and with conventional methods reveals that the seat and clip method requires only 6 operations against 22 ordinarily involved. In field erection, this ratio is 7 to 12. This is one of the important reasons why the system affords a saving of $3 to $5 per ton of steel erected—simply by cutting out over half of the operations usually required.

The net result of these savings is considerable economy in time and cost of erection of a new building or additions or alterations to a plant. Anyone contemplating such work will do well to investigate fully the possibilities this system affords.

One of the advantages of this method of construction is that the compression load at ends of beams transfers downward through the clip to the seat. A patented feature is the locking effect secured when the fillet in the neck of the clip locks down on the biting edge of the seat so it is firmly and safely wedged in place, thus preventing the steel from moving.

Already equivalent welded alternates have been developed using this method of assembly to substitute for any type of connection now in use. This makes it easy for a fabricator to substitute this type of construction.

Erection speeds obtained are high. For example, the Allied Arts building at Lynchburg, Va., was erected at a rate of three floors a week with no special effort being made toward speed.

It frequently is asked whether this method is safe. Anyone examining one of these assembly jobs will find that it is exceptionally safe due to the positive lock which occurs when the weight of the beam forces the clip on each end down into a wedge fit in the seat.

Carries 20,000 Pounds: Destruction tests show that both seat and clip are amply strong for the loads they carry. They are recommended for loads up to 20,000 pounds per connection. For heavier loads, they can be used in duplicate, or triplicate if necessary. However, the 30-inch rolled section girder beams carrying the main floor of the Du Pont hospital at Wilmington, Del., were assembled with only two clips and seats at each end, top and bottom, as is usually recommended. Even heavier members have been assembled thus with no difficulty whatever.

The erection seats and clips are made from selected forging stock, furnished to SAE-1020 specifications. Both seat and clip are drop forgings held to close limits in size to insure free and positive assembly.

The Saxe system meets requirements of all existing building codes.

Eight New Chemicals Now Available

■ Glyco Products Co. Inc., 230 King street, Brooklyn, N. Y., announces the availability of eight new commercial chemicals for test purposes. These are still in the pilot plant stage, but are priced on the basis of tonnage production as an inducement for experimental work.

The chemicals now available are: Butyl Cellosolve Oleate S 292, Carbitol Lactate S 336, Carbitol Maleate S 335, Cyclohexanol Stearate S 247, Diethylene Glycol Dinaphthenate S 288, Glyceryl Dioleate S 332, Glyceryl Dilaurate S 338 and Glyceryl Monohydroxy-stearate S 291.

Steel Men To Give All Facts on Big Expansion

Washington must weigh all pros and cons and make final decision. Filling out of blanks more onerous. Ore records inspire.

MARKET IN TABLOID ★

Demand

Purchases in May were less than in April.

Prices

Minor items, such as washers, tend to advance.

Production

Unchanged at 99.

■ STEELMAKERS will present full facts to Washington officials on the proposition of stepping up steel ingot production by 10,000,000 tons of ingots yearly. They will point out the amount of steel needed to create more steel, from added ore facilities to finished steel works, estimating the additional railroad cars, ships for hauling raw material, man power for building and operating the expanded mills.

Then it will be up to the government to decide whether this complicated program, which will require two years to fulfill, will be worth the effort in this era of rapidly-moving events, offset, as it will be, by removing materials, labor and time from immediate defense undertakings. It is obvious that if the steel expansion program is attempted, materials and labor must come out of that now supplying civilians.

In the current situation chief complaints involve the tremendous amount of time needed to fill out reports for the government, time which is needed for the ordinary routine of production, sales and shipments. It is often alleged that makers are being asked to do by Washington what they had already been doing to place steel where it will do most good. Yet the many reports are being filled out conscientiously and with good grace.

For many companies May established new records, particularly as to production. In several cases shipments for the month were at an all time high, at least for several departments, with last March the closest rival. Sales in May were usually less than in April because of greater reluctance to sell. The sales rate continues at 100 to 140 per cent of production.

Helpful to the morale of the entire industry were the record breaking shipments of over 11,000,000 tons of lake iron ore in May. Were this rate kept up over the rest of the year—which is improbable because of days of unfavorable weather and lack of storage facilities—about 85,000,000 tons will have been transported for the entire season, or nearly 30 per cent above the previous record. The performance is important since the foundation of the industry is ore.

Despite the cry of steel shortage for over half a year the fact is that practically no shutdowns have occurred among consumers because of lack of steel. This gives confidence that supply can be made to do, without intolerable hardships, for an indefinite period ahead. Moreover confidence in American ingenuity is being revived as the emergency is being met in manifold ways. Wooden ships are being built to relieve steel, for instance. Railroads may use larger proportions of wood, as in box cars, for the same reason. Where possible automobile makers are removing chromium plated parts where used for decoration to conserve that metal.

Some coke shortage again is feared as result of a cloudburst in western Pennsylvania which temporarily has shut down a number of mines which are the source of coal for metallurgical coke. Moreover high water on rivers interfered with loading of barges at tipples. The coke situation has never recovered completely from the coal strike of a few weeks back. It is impossible to purchase metallurgical coal in substantial tonnages for early delivery.

Pig iron production in May gained 2.5 per cent in daily rate, or as 148,262 tons in May compares with 144,685 tons in April. Aggregate May output was 4,596,113 tons as against 4,340,555 tons in April. During the month a net gain of 15 furnaces to 206 took place, a recovery from the coal strike, the largest number in blast since August, 1929 when 209 operated. Production rate in May was at 94.1 per cent of capacity as against 91.8 in April, highest rate since March, 1941, 96.3 per cent.

Scheduled automobile production for the week ended June 7 was at a new high of 133,645 units, a gain over the holiday week of 27,250, comparing with 95,560 for the corresponding week of 1940.

Steel ingot production nationally was unchanged at 99 per cent of capacity last week. It gained in two districts, each by 1 point, Chicago to 101½ per cent and eastern Pennsylvania to 97. Two districts dropped, Cleveland by 3 points to 93 and Cincinnati by 1 point to 91½. Unchanged were the following: St. Louis at 98, Detroit at 92, Birmingham at 95, Buffalo at 93, Pittsburgh at 100½, Wheeling at 88, New England at 90 and Youngstown at 97.

STEEL's three composite price groups for last week were unchanged: iron and steel at $38.15, finished steel at $56.60 and steelworks scrap at $19.16.

COMPOSITE MARKET AVERAGES

	June 7	May 31	May 24	One Month Ago May, 1941	Three Months Ago March, 1941	One Year Ago June, 1940	Five Years Ago June, 1936
Iron and Steel	$38.15	$38.15	$38.15	$38.15	$38.27	$37.69	$32.79
Finished Steel	56.60	56.60	56.60	56.60	56.60	56.60	52.20
Steelworks Scrap..	19.16	19.16	19.16	19.16	20.04	19.03	12.55

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	June 7, 1941	May 1941	March 1941	June 1940
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.47
Iron bars, Chicago	2.25	2.25	2.25	2.25
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.225	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv. Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to $\frac{9}{32}$-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	June 7, 1941	May 1941	March 1941	June 1940
Bessemer, del. Pittsburgh	$25.34	$25.34	$25.34	$24.34
Basic, Valley	23.50	23.50	23.50	22.50
Basic, eastern, del. Philadelphia	25.34	25.34	25.34	24.34
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	23.69
No. 2 foundry, Chicago	24.00	24.00	24.00	23.00
Southern No. 2, Birmingham	20.38	20.38	20.38	19.38
Southern No. 2, del. Cincinnati	24.06	24.06	24.06	23.06
No. 2X, del. Phila. (differ. av.)	26.215	26.215	26.215	25.215
Malleable, Valley	24.00	24.00	24.00	23.00
Malleable, Chicago	24.00	24.00	24.00	23.00
Lake Sup., charcoal, del. Chicago	31.34	31.09	30.34	30.34
Gray forge, del. Pittsburgh	24.19	24.19	24.18	23.17
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	115.33

Scrap

Heavy melting steel, Pitts.	$20.00	$20.00	$20.75	$19.90
Heavy melt. steel, No. 2, E. Pa.	17.75	17.75	18.65	18.10
Heavy melting steel, Chicago	18.75	18.75	19.43	18.00
Rails for rolling, Chicago	22.25	22.25	20.75	22.22
Railroad steel specialties, Chicago	23.75	....	23.56	21.37

Coke

Connellsville, furnace, ovens	$6.25	$5.70	$5.50	$4.75
Connellsville, foundry, ovens	7.25	6.30	6.00	5.75
Chicago, by-product fdry., del.	12.25	12.25	11.75	11.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.10c
Chicago, Gary	2.10c
Cleveland	2.10c
Detroit, del.	2.20c
Buffalo	2.10c
Sparrows Point, Md.	2.10c
New York, del.	2.34c
Philadelphia, del.	2.27c
Granite City, Ill.	2.20c
Middletown, O.	2.10c
Youngstown, O.	2.10c
Birmingham	2.10c
Pacific Coast ports	2.65c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast ports	3.70c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast ports	4.05c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.80c
Pacific Coast	4.55c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.40c	4.00c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 303	No 304
Bars	24.00	26.00	25.00
Plates	27.00	29.00	29.00
Sheets	34.00	36.00	36.00
Hot strip	21.50	27.00	23.50
Cold strip	28.00	33.00	30.00

20% Ni.-Cr. Clad

Plates	18.00*
Sheets	19.00

**Annealed and pickled*

Straight Chromes

	No. 410	No. 416	No. 430	No. 442
Bars	18.50	19.00	19.00	22.50
Plates	21.50	22.00	22.00	25.50
Sheets	26.50	27.00	29.00	32.50
Hot strip	17.00	18.25	17.50	24.00
Cold stp.	22.00	23.50	22.50	32.00

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c-2.54c
Philadelphia, del.	2.15c
Boston, delivered	2.42c-2.57c
Buffalo, delivered	2.35c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, Pa.	2.10c-2.35c
Sparrows Point, Md.	2.10c-2.35c
Claymont, Del.	2.10c-2.35c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast ports	2.65c

Steel Floor Plates

Pittsburgh	3.35c
Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	4.00c

Structural Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast ports	2.75c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Roofing Ternes

Pittsburgh base, package 112 *sheets* 20 x 28 *in., coating I.C.*

8-lb.	$12.00	25-lb.	$16.00
15-lb.	14.00	30-lb.	17.25
20-lb.	15.00	40-lb.	19.50

Bars

Soft Steel

(Base, 20 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.49c
Gulf ports	2.50c
Pacific Coast ports	2.80c

Rail Steel

(Base, 5 tons or over)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Detroit, delivered	2.25c
Cleveland	2.15c

Buffalo	2.15c
Birmingham	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.80c

Iron

Chicago	2.25c
Philadelphia, del.	2.37c
Pittsburgh, refined	3.50-8.00c
Terre Haute, Ind.	2.15c

Reinforcing

New Billet Bars, Base

Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt., Pitts.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

Rail Steel Bars, Base

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birm.	2.15c
Gulf ports	2.50c
Pacific Coast ports	2.60c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard and cement coated wire nails	$2.55
(Per Pound)	
Polished fence staples	2.55c
Annealed fence wire	3.05c
Galv. fence wire	3.40c
Woven wire fencing (base C. L. column)	67
Single loop bale ties, (base C.L. column)	59
Galv. barbed wire, 80-rod spools, base column	70
Twisted barbless wire, column	70

To Manufacturing Trade

Base, Pitts.-Cleve.-Chicago Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut Nails

Carload, Pittsburgh, keg $3.85

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.65c	3.35c
Chicago	2.65c	3.35c
Gary, Ind.	2.65c	3.35c
Detroit	2.70c	*3.45c
Cleveland	2.65c	3.35c
Buffalo	2.65c	3.35c

*Delivered.

Alloy Bars (Hot)

(Base, 20 tons or over)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.70c

Detroit, delivered 2.80c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.70	3300	3.80
2500	2.55	3400	3.20

4100 0.15 to 0.25 Mo. 0.55

4600 0.20 to 0.30 Mo. 1.50-2.00 Ni. 1.20

5100 0.80-1.10 Cr. 0.45

5100 Cr. spring flats 0.15

6100 bars 1.20

6100 spring flats 0.85

Cr. N., Van. 1.50

Carbon Van. 0.85

9200 spring flats 0.15

9200 spring rounds, squares 0.40

Electric furnace up 50 cents.

Alloy Plates (Hot)

Pittsburgh, Chicago, Coatesville, Pa. 3.50c

Strip and Hoops

(Base, hot strip, 1 ton or over; cold, 3 tons or over)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.10c
Detroit, del.	2.20c
Philadelphia, del.	2.42c
New York, del.	2.46c
Pacific Coast ports	2.75c
Cooperage hoop, Young., Pitts.; Chicago, Birm.	2.20c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.80c
Chicago	2.90c
Detroit, del.	2.90c
Worcester, Mass.	3.00c

Carbon	Cleve., Pitts.
0.26—0.50	2.80c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass. $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.35c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller	65½ off
Do., ⅝ and ¾ x 6-in. and shorter	63½ off
Do., ¾ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	56 off
Plow bolts	65 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
½-inch and less	62	64
⅝-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller	64 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless set screws	60 off

Piling

Pitts., Chgo., Buffalo 2.40c

Rivets, Washers

F.o.b. Pitts., Cleve., Chgo., Bham.

Structural	3.75c
⅞-inch and under	60-5-5 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l.	$4.50

Welded Iron, Steel, Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

In.	Blk.	Galv.
Steel		
½	63½	51
¾	66½	55
1—3	68½	57½
Iron		
¾	30	10
1—1¼	34	16
1½	38	18½
2	37½	18

Lap Weld

Steel		
2	61	49½
2½—3	64	52½
3½—6	66	54½
7 and 8	65	52½
Iron		
2	30½	12
2½—3½	31½	14½
4	33½	18
4½—8	32½	17
9—12	28½	12

Line Pipe

Steel		
1 to 3, butt weld	67½	
2, lap weld	60	
2½ to 3, lap weld	63	
3½ to 6, lap weld	65	
7 and 8, lap weld	64	
Iron		
¾ butt weld	25	4
1 and 1¼ butt weld	29	10
1½ butt weld	33	12½
2 butt weld	32½	13
1½ lap weld	23½	4
2 lap weld	25½	6
2½ to 3½ lap weld	26½	8½
4 lap weld	28½	12
4½ to 8 lap weld	27½	11
9 to 12 lap weld	23½	6

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut-lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O.D.	13	$ 9.72	$23.71
1¾" O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼" O.D.	13	13.79	21.68
2¼" O.D.	12	15.16	....
2½" O.D.	12	16.58	26.57
2¾" O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½" O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O.D.	13	$ 7.82	$ 9.01
1¼" O.D.	13	9.26	10.67
1½" O.D.	13	10.23	11.79
1¾" O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2⅛" O.D.	13	14.54	16.76
2¼" O.D.	12	16.01	18.45
2½" O.D.	12	17.54	20.21
2¾" O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½" O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½" O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$45.00-46.00
4-in., Birmingham	48.00-49.00
4-in., Chicago	56.80-57.80
6-in. & over, Chicago	53.80-54.80
6-in. & over, east fdy.	49.00
Do., 4-in.	52.00

Class A Pipe $3 over Class B

Stnd. fitgs., Birm., base $100.00.

Semifinished Steel

Rerolling Billets, Slabs
(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Youngs., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young, Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅝-inch incl. (per 100 lbs.)	$2.00
Do., over ⅝ to 11/32-in. incl.	2.15

Worcester up $0.10; Galveston up $0.25; Pacific Coast up $0.50.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt.	1.90c

Shell Steel

Pittsburgh, Chicago, base, 1000 tons of one size, open hearth

3-12-inch	$52.00
12-18-inch	54.00
18-inch and over	56.00

Coke

Price Per Net Ton
Beehive Ovens

Connellsville, fur.	$6.00- 6.25
Connellsville, fdry.	7.00- 7.50
Connell. prem. fdry.	7.25- 7.60
New River fdry.	6.50- 7.00
Wise county fdry.	5.50- 6.50
Wise county fur.	5.00- 5.25

By-Product Foundry

Newark, N. J., del.	12.60-13.05
Chicago, outside del.	11.50
Chicago, delivered	12.25
Terre Haute, del.	11.75
Milwaukee, ovens	12.25
New England, del.	13.75
St. Louis, del.	12.25
Birmingham, ovens	8.50
Indianapolis, del.	12.00
Cincinnati, del.	11.75
Cleveland, del.	12.30
Buffalo, del.	12.50
Detroit, del.	12.25
Philadelphia, del.	12.38

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	14.00c
Toluol, two degree	27.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (less than 1000 lbs.)	13.75c
Do. (1000 lbs. or over)	12.75c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	7.00c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$30.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$25.00	$25.50	$24.50	$26.00
Birmingham, Ala.§	20.38	....	19.38	24.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.00	25.50	24.50	26.00
Granite City, Ill.	24.00	24.00	23.50	24.50
Hamilton, O.	24.00	24.00	23.50	24.50
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	....	....	....
Sharpsville, Pa.	{24.00–24.50	24.00–24.50	23.50–24.50	24.50–25.00
Sparrow's Point, Md.	25.00	....	24.50	....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	{24.00–24.50	24.00–24.50	23.50–24.50	24.50–25.00

§Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	25.39	25.39	24.89	25.89
Baltimore from Birmingham†	25.61	....	25.11	....
Boston from Birmingham†	25.12	....	....	....
Boston from Everett, Mass.	25.50	26.00	25.00	26.50
Boston from Buffalo	25.50	26.00	25.00	26.50
Brooklyn, N. Y., from Bethlehem	27.50	28.00	....	....
Canton, O. from Cleveland	25.39	25.39	24.89	25.89
Chicago from Birmingham	†24.22	....	....	....
Cincinnati from Hamilton, O.	24.44	25.11	24.61	....
Cincinnati from Birmingham†	24.06	....	23.06	....
Cleveland from Birmingham†	24.12	....	23.12	....
Mansfield, O., from Toledo, O.	25.94	25.94	25.44	....
Milwaukee from Chicago	25.10	25.10	24.60	25.60
Muskegon, Mich., from Chicago, Toledo or Detroit	27.19	27.19	....	....
Newark, N. J., from Birmingham†	26.15	....	....	....
Newark, N. J., from Bethlehem	26.53	27.03	....	....
Philadelphia from Birmingham†	25.46	....	24.96	....
Philadelphia from Swedeland, Pa.	25.84	26.34	25.34	....

Pittsburgh dist.: Add to Neville Island base, North and South Sides, 69c; McKees Rocks, 55c; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, 84c; Monessen, Monongahela City, $1.07; Oakmont, Verona, $1.11; Brackenridge, $1.24.

	No. 2 Fdry.	Malleable	Basic	Bessemer
Saginaw, Mich., from Detroit	26.31	26.31	25.81	26.81
St. Louis, northern	24.50	24.50	24.00	....
St. Louis from Birmingham	†24.12	....	23.62	....
St. Paul from Duluth	26.63	26.63	....	27.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50, base; $30.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$28.00
Pitts. dist. fur.	23.50	do., del. Chicago	31.34
		Lyles, Tenn., high phos.	28.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $29.50; 6.51-7—$30.00; 7-7.50—$30.50; 7.51-8—$31.00; 8-8.50—$31.50; 8.51-9—$32.00; 9-9.50—$32.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo, is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	56.00

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	26.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$50.00
Chem. bonded chrome	50.00
Magnesite brick	72.00
Chem. bonded magnesite	61.00

Fluorspar

Washed gravel, duty pd., tide, net ton	$25.00-$26.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	20.00-21.00
Do. barge	20.00
No. 2 lump	20.00-21.00

Ferroalloy Prices

Ferromanganese, 78-82%, carlots, duty pd. $120.00
Ton lots 130.00
Less ton lots 133.50
Less 200 lb. lots 138.00
Do., carlots del. Pitts. 125.33

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 36.00

Ferrosilicon, 50%, freight allowed, c.l. 74.50
Do., ton lot 87.00
Do., 75 per cent 135.00
Do., ton lots 151.00
Spot, $5 a ton higher.

Silicomanganese, c.l., 2½ per cent carbon 118.00
1¼% carbon 128.00
Contract ton price $12.50 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.90-2.00

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electric furn., per ton, c. l., 23-26% f.o.b. Mt. Pleasant, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 11.00c
Do., ton lots 11.75c
Do., less-ton lots 12.00c
less than 200 lb. lots 12.25c

67-72% low carbon:

	Carloads	Ton lots	Less ton
2% carb.	17.50c	18.25c	18.75c
1% carb.	18.50c	19.25c	19.75c
0.10% carb.	20.50c	21.25c	21.75c
0.20% carb.	19.50c	20.25c	20.75c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Molybdenum Oxide, lb. Molyb. cont., 5-20-lb. containers, f. o. b., Washington, Pa., lb. 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do., less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60% contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do., less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do., spot 145.00
Do., contract, ton lots 145.00
Do., spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do., spot 160.00
Do., contract, ton lots 160.00
Do., spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do., ton lots 8.00c
Do., less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, freight allowed, lb. carlots, bulk 7.00c
Do., ton lots 7.50c
Do., less-ton lots 7.75c
Do., less 200 lbs. 8.00c
Spot ¼c lb. higher

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.50
Do., smaller lots 2.60

Vanadium Pentoxide, contract, lb. contained $1.10
Do., spot 1.15

Chromium Metal, 98% cr., contract, lb. con. chrome, ton lots 80.00c
Do., spot 85.00c
88% chrome, cont. tons 79.00c
Do., spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.50c
Do., 2% 13.00c
Spot ¼c higher

Silicon Briquets, contract carloads, bulk, freight allowed, ton $74.50
Ton lots 84.50
Less-ton lots, lb. 4.00c
Less 200 lb. lots, lb. 4.25c
Spot ¼-cent higher

Manganese Briquets, contract carloads, bulk freight allowed, lb. 5.50c
Ton lots 6.00c
Less-ton lots 6.25c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, bulk, gross ton 102.50
Do., ton 108.00
35-40%, contract, carloads, lb., alloy 14.00c
Do., ton lots 15.00c
Do., less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do., 100-200 lb. lots 2.75
Do., under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: S.A.E. 2300	Cold Drawn Bars: S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.48	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	4.75	3.31	4.06	8.56	7.16
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.05	....	....
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.52	3.75	8.40	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.65	....	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.43	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.40	3.80	8.70	7.05
Omaha	4.10	4.20	4.20	4.15	4.15	5.75	3.85	5.32	5.50	..	4.42	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.00	4.92	3.47	4.00	8.75	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.25	4.10	4.85	3.30	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.85	5.25	3.83	4.34	9.09	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.18	4.23	4.73	3.54	3.88	8.38	6.98
St. Louis	3.64	3.74	3.74	3.69	3.69	5.29	3.39	4.24	4.99	3.61	4.02	8.77	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	3.97	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Chattanooga	3.80	4.00	4.00	3.85	3.85	5.80	3.75	....	4.50	....	4.39	....	....
Tulsa, Okla.	4.44	4.34	4.34	4.49	4.49	6.09	4.19	....	5.79	....	4.69	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.93	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	4.80	5.00	4.60	....	....
Houston, Tex.	3.75	5.95	5.95	4.10	4.10	5.50	4.20	....	5.25	....	6.90	....	....
Seattle	4.00	4.00	5.20	4.00	4.00	5.75	4.00	6.50	5.25	....	5.75	....	....
Portland, Oreg.	4.25	4.50	6.10	4.00	4.00	5.75	3.95	6.50	5.00	....	5.75	....	....
Los Angeles	4.15	4.65	6.45	4.15	4.15	6.40	4.30	6.50	5.50	....	6.60	10.55	9.80
San Francisco	3.90	4.40	6.00	3.90	3.90	5.60	3.90	6 40	5.65	....	6.80	10.65	9.80

	S.A.E. Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	5.85	....	8.00	7.85	8.65
Portland, Oreg.	5.70	8.85	8.00	7.85	8.65
Los Angeles	4.80	9.55	8.55	8.40	9.05
San Francisco	5.25	9.65	8.80	8.65	9.30

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300 pounds and over, Portland, Seattle; 400-14,999 Twin Cities; 400-3999 Birmingham; 400 pounds and over in Memphis.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Omaha, Kansas City, St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 3500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 25 to 49 bundles in Philadelphia; 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

EUROPEAN IRON, STEEL PRICES

Dollars at $4.02½ per Pound Sterling

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	BRITISH Gross Tons f.o.b U.K. Ports	£	s	d
Merchant bars, 3-inch and over	$66.50	16	10	0
Merchant bars, small, under 3-inch, re-rolled	3.60c	20	0	0
Structural shapes	2.79c	15	10	0
Ship plates	2.90c	16	2	6
Boiler plates	3.17c	17	12	6
Sheets, black, 24 gage	4.00c	22	5	0
Sheets, galvanized, corrugated, 24 gage	4.61c	25	12	6
Tin plate, base box, 20 x 14, 108 pounds	$ 6.29	1	11	4

British ferromanganese $120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices Delivered at Works or Furnace—

	£	s	d
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$25.79	6	8 0(a)
Basic pig iron	24.28	6	0 6(a)
Furnace coke, f.o.t. ovens	7.15	1	15 6
Billets, basic soft, 100-ton lots and over	49.37	12	5 0
Standard rails, 60 lbs. per yard, 500-ton lots & over	2.61c	14	10 6
Merchant bars, rounds and squares, under 3-inch	3.17c	17	12 0††
Shapes	2.77c	15	8 0††
Ship plates	2.91c	16	3 0††
Boiler plates	3.06c	17	0 6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c	22	15 0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c	26	2 6
Plain wire, mild drawn, catch weight coils, 2-ton lots and over	4.28c	23	15 0
Bands and strips, hot-rolled	3.30c	18	7 0

(a) del. Middlesbrough 5s rebate to approved customers. ††Rebate 15s on certain conditions.

Ores

Lake Superior Iron Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	10.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Chinese wolframite, net ton, duty pd.	$24.00-25.00
Brazil iron ore, 68-69%, ord.	7.50c
Low phos. (.02 max.)	8.00c

F.O.B. Rio Janeiro.

Scheelite, imp.	23.50-24.00
Chrome ore, Indian, 48% gross ton, cif.	$43.00-46.00

Manganese Ore

Including war risk but not duty, cents per unit cargo lots.

Caucasian, 50-52%	....
So. African, 48%	70.00-72.00
Brazilian, 46%	69.00-71.00
Chilean, 47%	65.00-70.00
Cuban, 50-51%, duty free	67.50

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

IRON AND STEEL SCRAP PRICES

Maximum Prices Announced by Office of Price Administration and Civilian Supply (Gross Tons)

	Pittsburgh, Wheeling, Steubenville	Youngstown, Canton, Sharon	Chicago, Kokomo, Peoria	S. Bethlehem	*East. Pa.	Sparrows Pt.	Cleveland	Buffalo	South Ohio†
No. 1 heavy melting	$20.00	$20.00	$18.75	$18.25	$18.75	$18.25	$19.50	$19.25	$18.50
No. 1 hyd. comp. black sheets	20.00	20.00	18.75	18.25	18.75	18.25	19.50	19.25	18.50
No. 2 heavy melting	19.00	19.00	17.75	17.25	17.75	17.25	18.50	18.25	17.50
Dealer No. 1 bundles	19.00	19.00	17.75	17.25	17.75	17.25	18.50	18.25	17.50
Dealer No. 2 bundles	18.00	18.00	16.75	16.25	16.75	16.25	17.50	17.25	16.50
Mixed borings and turnings	15.25	15.25	14.00	13.50	14.00	13.50	14.75	14.50	13.75
Machine shop turnings	15.50	15.50	14.25	13.75	14.25	13.75	15.00	14.75	14.00
Shovel turnings	16.50	16.50	15.25	14.75	15.25	14.75	16.00	15.75	15.00
No. 1 busheling	19.50	19.50	18.25	17.75	18.25	17.75	19.00	18.75	18.00
No. 2 busheling	15.50	15.50	14.25	13.75	14.25	13.75	15.00	14.75	14.00
Cast iron borings	15.75	15.75	14.50	14.00	14.50	14.00	15.25	15.00	14.25
Uncut structurals and plate	19.00	19.00	17.75	17.25	17.75	17.25	18.50	18.25	17.50
No. 1 cupola	21.00	21.00	20.00	22.50	23.00	22.00	22.00	20.00	21.00
Heavy breakable cast	19.50	19.50	18.50	21.00	21.50	21.00	20.50	18.50	19.50
Stove plate	19.00	.....	16.00	18.00	18.50	18.00	15.75	19.00	13.00
Low phos. billet, bloom crops	25.00	25.00	23.75	23.25	23.25	23.25	24.50	24.25	23.50
Low phos. bar crops and smaller	23.00	23.00	21.75	21.25	21.75	21.25	22.50	22.25	21.50
Low phos. punch., plate scrap	23.00	23.00	21.75	21.25	21.75	21.25	22.50	22.25	21.50
No. 2 cupola	20.00	20.00	19.00	21.50	22.00	21.50	21.00	19.00	20.00
Machinery cast cupola size	22.00	22.00	21.00	23.50	24.00	23.50	23.00	21.00	22.00
No. 1 machine cast, drop broken, 150 pounds and under	22.50	22.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50
Clean auto cast	22.50	22.50	21.50	24.00	24.50	24.00	23.50	21.50	22.50
Punchings and plate scrap‡‡	22.00	22.00	20.75	20.25	20.75	20.25	21.50	21.25	20.50
Punchings and plate scrap§§	21.00	21.00	19.75	19.25	19.75	19.25	20.50	20.25	19.50
Heavy axle and forge turnings	19.50	19.50	18.25	17.75	18.25	17.75	19.00	18.75	18.00
Medium heavy elec. furnace turnings	18.00	18.00	16.75	16.25	16.75	16.25	17.50	17.25	16.50

	St. Louis	Kansas City	Detroit	Duluth	Birmingham¶	Chattanooga	Radford, Va.	New England‡	Pacific Coast§
No. 1 heavy melting	$17.50	$16.00	$17.85	$18.00	$17.00	$.....	$.....	$15.50	$14.50
No. 1 hyd. comp. black sheets	17.50	16.00	17.85	18.00	17.00	.....	.....	15.50	14.50
No. 2 heavy melting	16.50	15.00	16.85	17.00	16.00	.....	.....	14.50	13.50
Dealer No. 1 bundles	16.50	15.00	16.85	17.00	16.00	.....	.....	14.50	13.50
Dealer No. 2 bundles	15.50	14.00	15.85	16.00	15.00	.....	.....	13.50	12.50
Mixed borings and turnings	12.75	11.25	13.10	13.25	12.25	.....	.....	10.75	9.75
Machine shop turnings	13.00	11.50	13.35	13.50	12.50	.....	.....	11.00	10.00
Shoveling turnings	14.00	12.50	14.35	14.50	13.50	.....	.....	12.00	11.00
No. 1 busheling	17.00	15.50	17.35	17.50	16.50	.....	.....	15.00	14.00
No. 2 busheling	13.00	11.50	13.35	13.50	12.50	.....	.....	11.00	10.00
Cast iron borings	13.25	11.75	13.50	13.75	12.75	.....	.....	11.25	10.25
Uncut structurals and plate	16.50	15.00	16.25	17.00	16.00	.....	.....	14.50	13.50
No. 1 cupola	20.00	15.00	19.00	21.00	17.75	20.00	21.00	22.00	18.00
Heavy breakable cast	18.50	13.50	17.50	19.50	16.25	.....	.....	20.50	17.00
Stove plate	14.50	12.50	12.75	.....	12.00	.....	.....	14.00	14.00
Low phos. billet and bloom crops	22.50	21.00	22.85	23.00	22.00	.....	.....	20.50	.....
Low phos. bar crops and smaller	20.50	19.00	20.85	21.00	20.00	.....	.....	18.50	.....
Low phos. punch. and plate scrap**	20.50	19.00	20.85	21.00	20.00	.....	.....	18.50	.....
No. 2 cupola	19.00	14.00	18.00	20.00	16.75	19.00	20.00	21.00	17.00
Machinery cast cupola size††	21.00	16.00	20.00	22.00	18.75	21.00	22.00	23.00	19.00
No. 1 machine cast, drop broken, 150 pounds and under	21.50	16.50	20.50	22.50	19.25	21.50	22.50	23.50	19.50
Clean auto cast	21.50	16.50	20.50	22.50	19.75	21.50	22.50	23.50	19.50
Punchings and plate scrap‡‡	19.50	18.00	19.85	20.00	19.00	.....	.....	17.50	.....
Punchings and plate scrap§§	18.50	17.00	18.85	19.00	18.00	.....	.....	16.50	.....
Heavy axle and forge turnings	17.00	15.50	17.35	17.50	16.50	.....	.....	15.00	14.00
Medium heavy elec. furnace turnings	15.50	14.00	15.85	16.00	15.00	.....	.....	13.50	12.50

*Claymont, Del., Coatesville, Phoenixville, Harrisburg, Pa. †Portsmouth, Middletown, O., Ashland, Ky. ‡Worcester, Mass.; Bridgeport, Conn.; Phillipsdale, R. I. §Los Angeles, San Francisco, Portland, Oreg., Seattle; ¶Prices are for scrap delivered to the Birmingham, Ala., consuming point, excepting scrap for Birmingham consumption originating west of the western boundary of Alabama. In the latter case the Birmingham, Ala., consumer may pay $1 more than the prices indicated under "Birmingham"; **⅜-inch and heavier, cut 12 inches and under; ††may include clean agricultural cast; ‡‡under ⅜-inch to ¼-inch, cut 12 inches and under; §§under ¼-inch to No. 12 gage, cut 12 inches and under.

Maximum Prices for Iron and Steel Scrap Originating from Railroads

	Pittsburgh, Wheeling, Steubenville	Youngstown, Canton, Sharon	Chicago, Kokomo, Peoria	S. Bethlehem	*East. Pa.	Sparrows Pt.	Cleveland	Buffalo	South Ohio†
No. 1 Railroad grade heavy melting steel	$21.00	$21.00	$19.75	$.....	$19.75	$19.75	$20.50	$20.25	$19.50
Scrap rails	22.00	22.00	20.75	.....	20.75	20.75	21.50	21.25	20.50
Rerolling quality rails	23.50	23.50	22.25	.....	22.25	22.25	23.00	22.75	22.00
Scrap rails 3 feet and under	24.00	24.00	22.75	.....	22.75	22.75	23.50	23.25	22.50
Scrap rails 2 feet and under	24.25	24.25	23.00	.....	23.00	23.00	23.75	23.50	22.75
Scrap rails 18 inches and under	24.50	24.75	23.50	.....	23.50	23.50	24.25	24.00	23.25

	St. Louis	Kansas City	Detroit	Duluth	Birmingham	Chattanooga	Radford, Va.	New England‡	Pacific Coast§
No. 1 Railroad grade heavy melting steel	$18.50	$17.00	$18.85	$19.00	$18.00	$.....	$.....	$16.50	$15.50
Scrap rails	19.50	18.00	19.85	20.00	19.00	.....	.....	17.50	16.50
Rerolling quality rails	21.00	19.50	21.35	21.50	20.50	.....	.....	19.00	18.00
Scrap rails 3 feet and under	21.50	20.00	21.85	22.00	21.00	.....	.....	19.50	18.50
Scrap rails 2 feet and under	21.75	20.25	22.10	22.25	21.25	.....	.....	19.75	18.75
Scrap rails 18 inches and under	22.25	20.50	22.60	22.75	21.75	.....	.....	20.25	19.25

*Philadelphia, Wilmington, Del. †Portsmouth, Middletown, O., Ashland, Ky. ‡Worecster, Mass.; Bridgeport, Conn.; Phillipsdale, R. I. §Los Angeles, San Francisco, Portland, Oreg., Seattle.

NOTE: Where the railroad maker of scrap operates in two or more of the consuming points named above, the highest of the maximum prices set out above for such consuming points shall be the maximum price at consumer's plant at any point on the railroad's line, except: Where a railroad from which scrap originates operates in two or more consuming points having different switching charges, the price of such railroad scrap: (1) To a consumer located within a consuming point having the highest switching charge, shall not exceed the maximum on-the-line price established above; (2) To a consumer located within a consuming point not having the highest switching charge, shall not exceed the maximum on-the-line price established above less the difference between the switching charges at that consuming point and at the consuming point having the highest switching charges; (3) To a consumer located on the line of the railroad at a point having no switching charges, shall not exceed the maximum on-the-line price established above less the highest switching charge at any consuming point on the line; and (4) To a consumer located off the line of the railroad, shall not exceed the maximum off-the-line price established below less the highest switching charge at any consuming point on the line.

Sheets, Strip

Sheet & Strip Prices, Pages 110, 111

Demand for sheets for defense work is increasing and under priority is deferring shipment of much commercial tonnage already on books. Most makers are refusing to accept orders for delivery in 1942 for non-defense use but much now on books will not be delivered this year. Only high priority rating material has any chance of being accepted by most mills.

Third quarter delivery schedules reveal that tonnage for other than defense use has been reduced 30 per cent from preceding quarters. Before the quarter is over the proportion may be even greater. Efforts of consumers to build inventories over past months may have been sufficiently successful to soften the effect of this curtailment for a time.

Stampers and other industrial users of sheets are obtaining sufficient material to maintain operations but some smaller fabricators with no defense contracts are nearing the end of their inventories. This has resulted in some of the latter taking defense orders, thereby spreading production of needed articles.

Sheet sellers believe the recent priority control order will relieve them to some degree from the embarrassment of refusing delivery to non-defense consumers. When consumers make affidavit to the priorities division the decision rests there rather than with the producer. It is believed manufacturers of commercial products will weigh their requirements more carefully before appealing to OPM.

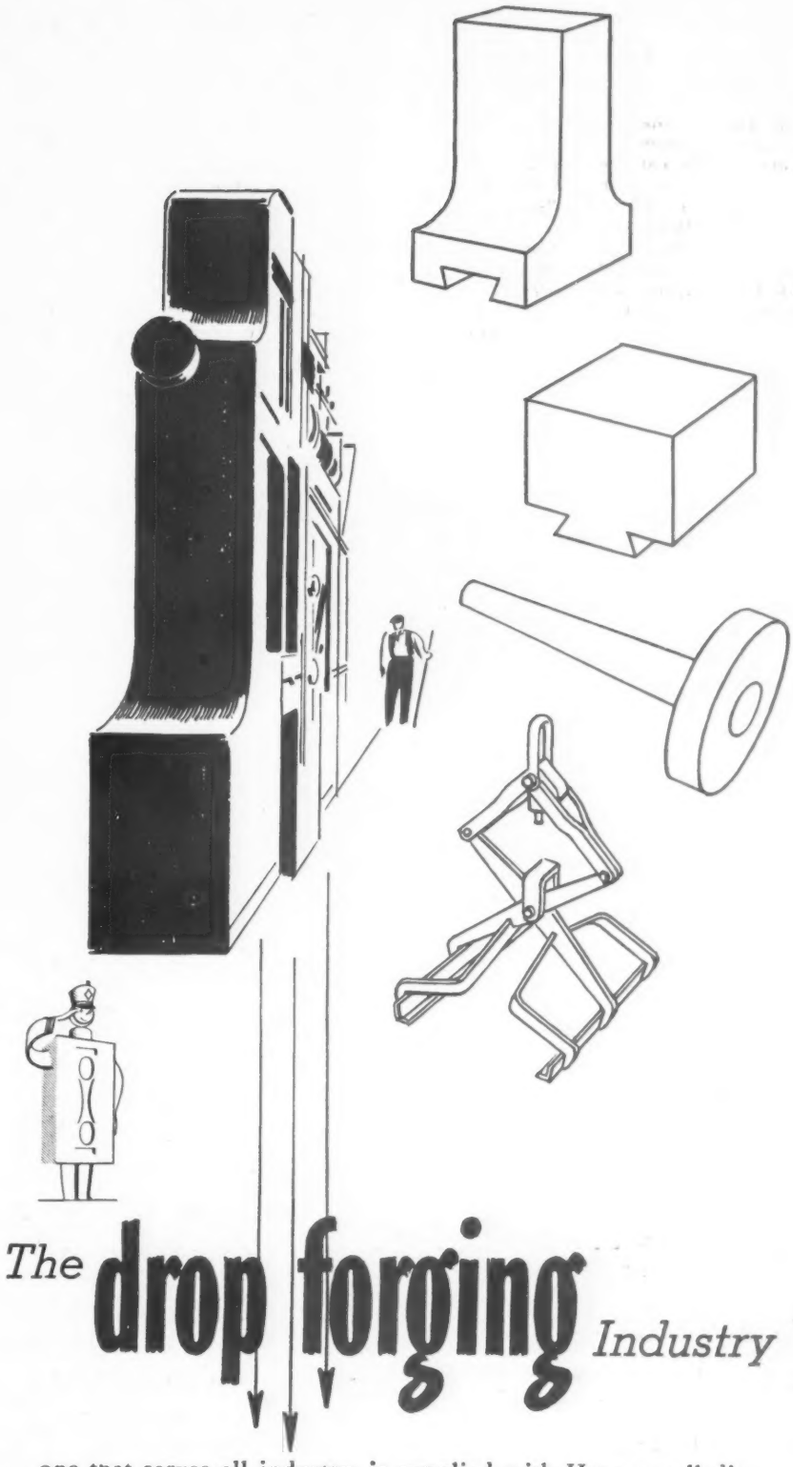
Inventory control is also relied on to reduce the volume of releases in view of regulations against increasing inventory. Much duplication of orders has been evident, non-defense users seeking by every means to obtain deliveries before priorities are put in force. In effect there will be little difference, as producers have been rating orders according to defense urgency. Under priority this will be done by the government division.

A large sheetmaker is ready to roll plates ¼ to 5/16-inch thick, up to 74 inches wide, on a continuous sheet mill. Some curtailment on sheets to automobile builders is expected, to release capacity for plate production. One mill specializing in plates is seeking to confine sales to flanged and firebox steel, on which the price is more advantageous.

Plates

Plate Prices, Page 110

Plate demand, already heavy for defense, promises to be further increased soon by awards of material for large-size pipe for oil pipe lines now under consideration. Platemakers are besieged by fabricators for deliveries to complete nondefense jobs already under way, on which no more material is being shipped and on which construction has been stopped. These include



The **drop forging** Industry

. . one that serves all industry, is supplied with Heppenstall die blocks for forging parts and products, hammer rams, saw blocks, piston rods, shear knives for cutting metal, trimmer steels and hammer guides, Heppenstall Automatic Safe-T-Tongs for lifting materials, "tailor-made" forgings and many other forged products. Heppenstall Company.

Heppenstall

PITTSBURGH · DETROIT · BRIDGEPORT

bridges, commercial buildings and others.

Fabricators find little difficulty in obtaining sufficient plates for defense work and schedules have been able to meet demands for essential purposes.

Much interest is manifested in outcome of present efforts to obtain priority for material for car and locomotive building. With delivery already tight a high preference on this material would be an added complication. While few makers will quote beyond the end of the year it is apparent that delivery on many orders will be delayed until next year, especially if railroad car material is pushed ahead.

Releases for shipbuilding are heavy and shipments as a rule are close to schedule, no delay being caused by lack of material. Firebox and boiler steel are active and deliveries promised run to 30 weeks or more unless included in combination orders. Demand for flanged work and boiler heads is heavy and when accompanied by plate orders can be shipped in 16 to 20 weeks. When such orders apparently have too large a proportion of plates they are refused or split among several producers. Small tank consumption is heavy and light plates, 3/16 to ¾-inch, is acute.

Inquiries for several lots of 40,000 to 50,000 pounds of plates for melting tanks for the Plum Brook ordnance plant near Sandusky, O., have been issued.

PLATE CONTRACTS PLACED

400 tons, two ice-breaker type cutters for navy, Seattle, to Birchfield Boiler Works, Tacoma, Wash.

300 tons, 1,000,000-gal. standpipe, navy yard, Portsmouth, N. H., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

100 tons or more, elevated water tank, Jefferson Barracks, Mo., to Pittsburgh-Des Moines Steel Co., Des Moines, Iowa, $82,700.

PLATE CONTRACTS PENDING

60,000 tons or more, 30 C-3 cargo freighters for Maritime Commission; Seattle-Tacoma Shipbuilding Co., contractor.

1800 tons or more, six cutters for coast guard.

Bars

Bar Prices, Page 110

Bar inquiry is greatly in excess of supply. A number of large sellers refuse to book additional orders except for defense, since capacity is filled to the end of the year and no quotations are being made for next year.

Producers of cold-drawn bars in many cases are receiving hot bars originally scheduled for January shipment and this causes delay in delivery of cold-drawn material. Though deliveries are as much as five months in arrears no cancellations have been received.

Priority orders continue to increase and it is believed the top has not been reached. In the Buffalo district bars for non-defense work have been reduced to less than 25 per cent of current output. Mills in that district are trying to fill substantial tonnages sought by the automotive industry.

An eastern interest has distributed 25,000 tons of bars for production of six-inch shells.

The priorities control ruling allowing recourse to the priorities division to obtain needed material is welcomed by mills as it relieves them in a measure from having to make decisions against regular customers. This ruling is being invoked already by some consumers who have been unable to get needed deliveries.

In New England, where small arms manufacture, machine tool building and naval construction are large factors, heavy releases of alloys bars are being filed. Including forging billets, more than 90 per cent of current bar production is being used for defense work in that area and deliveries for defense work are well maintained. Marine requirements are heavier, including nickel steel for forged chains and wrought iron for coast guard buoy chains.

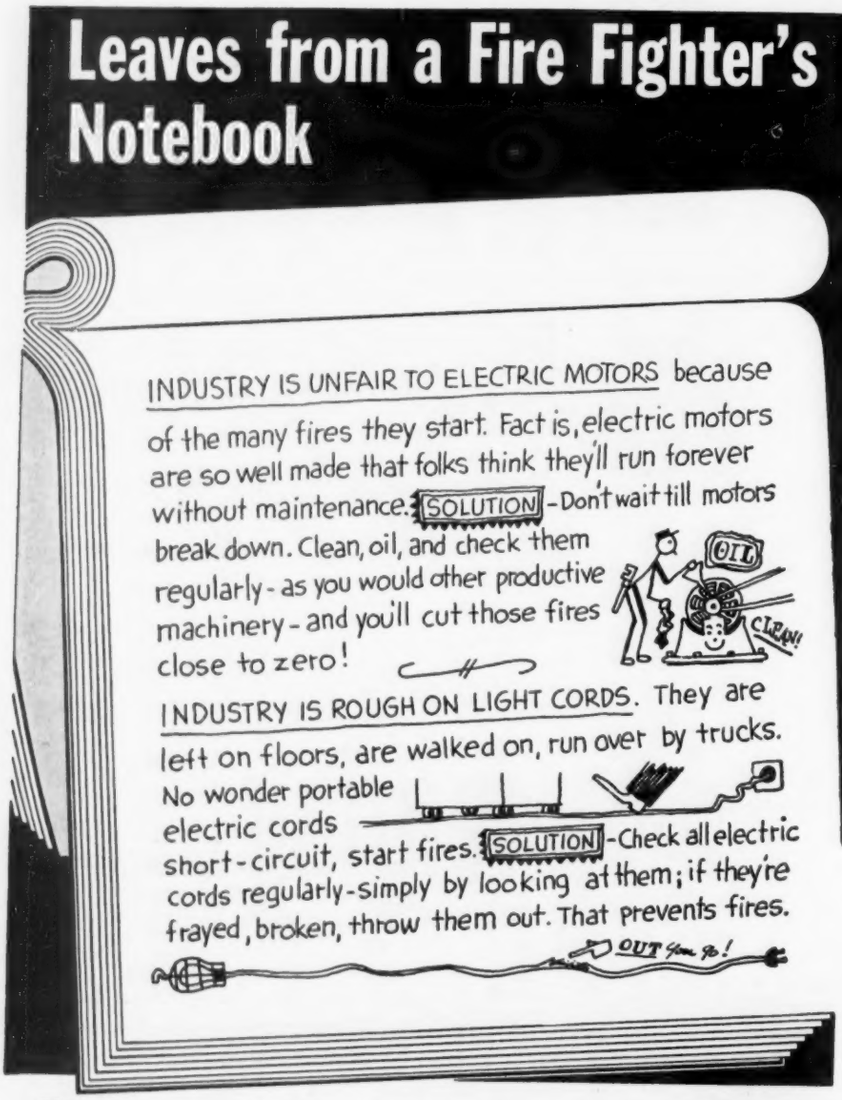
Distributors note a marked shift in priority orders to hot-rolled bars in contrast to a few weeks ago when alloy steel, particularly nickel and tungsten bearing, was in most demand.

Wire

Wire Prices, Page 111

Annealing and processing operations are frequent bottlenecks in wire production, notably in

Leaves from a Fire Fighter's Notebook


INDUSTRY IS UNFAIR TO ELECTRIC MOTORS because of the many fires they start. Fact is, electric motors are so well made that folks think they'll run forever without maintenance. SOLUTION - Don't wait till motors break down. Clean, oil, and check them regularly - as you would other productive machinery - and you'll cut those fires close to zero!
OIL
CLEAN!
INDUSTRY IS ROUGH ON LIGHT CORDS. They are left on floors, are walked on, run over by trucks. No wonder portable electric cords short-circuit, start fires. SOLUTION - Check all electric cords regularly - simply by looking at them; if they're frayed, broken, throw them out. That prevents fires.
OUT you go!

DID you ever consider *built-in* fire extinguishers? LUX Fixed Systems guard large electrical machinery, processes involving flammable liquids such as oils, paints, chemicals. Automatically or manually controlled LUX systems smother fires in a blizzard of carbon dioxide snow-and-gas. Though one of the fastest of all extinguishing agents, LUX gas leaves no mess, moisture, or corrosion. Consider built-in LUX protection for your severest hazards.

This is one of a series of advertisements discussing industrial fire protection. Reprints will be sent on request.

LUX

Walter Kidde & Company, Inc.
632 West Street, Bloomfield, N. J.

specialties, and deliveries on an increasing number of items are more extended, despite large installations of annealing and other processing equipment by most mills during the last year. Producers of wire and strip are also putting the brakes on heavy releases and specifications by the automotive industry and partsmakers. The latter have not voluntarily slackened specifications, but suppliers, feeling inventories of steel and finished parts in some instances have reached too high a mark, are curtailing deliveries. Orders for spring wire covering shipment for the remainder of the year are heavier and backlogs are large.

Nails are also active, showing no seasonal decline in inquiry. Rods continue in limited supply, although a few producers of screws, bolts and other fabricated materials have large stocks. Considering high rate of production, however, such inventories are not as heavy as might be thought. Sales on some are also being made below ceiling prices, rope being an example of some scattered shading.

Mills producing cable, especially for marine use, have record-breaking backlogs and rope buying has revived after a slight lull. Most wire rod production is moving directly into consumption and stocks are low, constituting a choke point in some cases.

Pipe

Pipe Prices, Page 111

Seamless steel pipe producers, particularly those making large diameter line pipe, would welcome priorities. Order books are heavily filled, deliveries are much behind schedule and plans for pipe line construction involving 7000 to 10,000 miles presents a further difficult problem.

Merchant pipe demand is expected to be increased shortly because of the plan to build additional cantonments for an enlarged army.

In mechanical tubing aircraft construction has a priority rating and non-defense consumers would be in no worse position if full priorities were established. In standard pipe shipments of galvanized are dwindling and black pipe is being substituted. Lack of copper for pipe fabrication is increasing demand for steel and wrought iron.

In New England distributors have built up stocks of galvanized and black merchant pipe, some having four months supply. Resale prices are firmest in many months.

Releases against blanket contracts and scattered small-lot buying maintain cast iron pipe foundry production at five days a week and stocks are not being accumulated. Corrugated galvanized culvert pipe is scarce, due to small supply of galvanized sheets. Some mills can make delivery of conduit pipe in fourth quarter.

In the Birmingham, Ala., district government buying has caused cast iron pipe operations to be increased to six days a week. Capacity is sufficient to meet current demands but not much margin remains.

New York city has increased its original contract for 11,000 tons placed earlier in the year and is taking all additional tonnage available, probably requiring 20,000 tons in all. Pipe foundries in a position to take added tonnage are sharing in this increase.

CAST PIPE PLACED

600 tons, U. S. engineer, St. Louis, to James B. Clow & Sons, Kansas City, Mo.

CAST PIPE PENDING

3275 tons, 12 and 16-inch pipe, Los Angeles; United States Pipe & Foundry Co., Burlington, N. J., low on 1400 tons, National Cast Iron Pipe Co., Birmingham, Ala., low on 950 tons and American Cast Iron Pipe Co., Birmingham, Ala., low on 925 tons.

Unstated, 16-inch water main at Fort Lewis, Wash. cantonment; Valley Construction Co., West Coast Construction Co., Seattle, and Paine & Gallucci, Tacoma, low on various schedules.

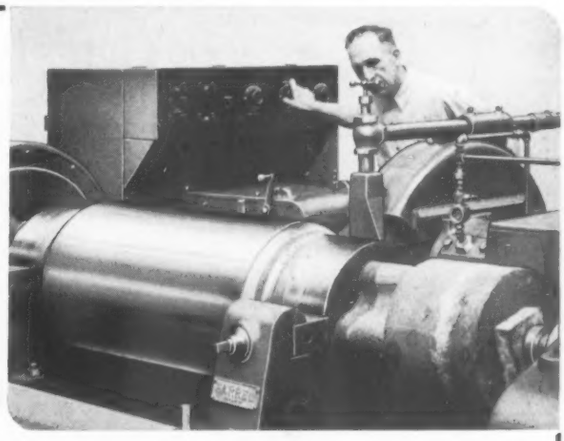
Tin Plate

Tin Plate Prices, Page 110

With the announcement by Carnegie-Illinois Steel Corp. of resumption of operations at its Shenango works, New Castle, Pa., all tin mills in the Pittsburgh district are now active.

The Shenango works, which has 40 outmoded hot mills, will begin

Complete Control from One Position Contributes to



High Output of Rolls from FARREL ROLL GRINDERS

This illustration of the control panel of the Farrel Heavy Duty Roll Grinder shows at a glance how *centralized fingertip control* contributes to the high output of accurately ground and flawlessly finished rolls for which this machine is noted.

Without moving from his station, the operator may reach any control button or rheostat with a single movement of the arm. On a fully enclosed panel at the operator's right are located all push buttons and rheostats for the control of the several motors, with the exception of the rapid wheel feed, which is located on the operator's left next to the indexed handwheel for hand feeding of the grinding wheel. For ease in setting up a roll in the grinder, additional push buttons for controlling the headstock motor are mounted on the headstock.

This complete *centralized fingertip control* reduces movement of the operator to a minimum; his entire attention and energy may be devoted to the work, thus assuring a continuity of output and a high daily *production with precision* which keeps roll refinishing costs at a minimum.

For full particulars of additional features which combine to give the Farrel Heavy Duty Roll Grinder its record for smooth, vibrationless performance, superior finish and high output, let us send you a copy of Bulletin No. 111. This booklet contains complete specifications and illustrated description of all features.

FARREL FARREL-BIRMINGHAM COMPANY, Inc.
ANSONIA, CONN.
New York • Buffalo • Pittsburgh • Akron • Chicago • Los Angeles

operations on 20 mills June 16. Last operated in 1939, these mills have not been needed until the present emergency pyramided tin plate requirements for domestic and export markets. Only a few weeks ago the Laughlin works, Martins Ferry, O., was sold to Blaw-Knox Co., Pittsburgh, for defense production work. This also was a plant of Carnegie-Illinois. Two independent producers still are making hot-rolled tin plate in the Pittsburgh district, Washington Tin Plate Co., Washington, Pa., and Standard Tin Plate Co., Canonsburg, Pa.

The national production rate last week was 92 per cent, an increase of 2 points over the preceding week. In Pittsburgh district production is well over 100 per cent of capacity.

Incoming demand is somewhat lighter, principally because domestic buyers have covered their needs.

Rails, Cars

Track Material Prices, Page 111

Domestic freight car buying in May, involving 18,630 cars, was the heaviest since October, 1939, when 19,644 cars were awarded. The May total brought bookings for the first five months to 62,026, against 8698 in the corresponding period last year, 8208 in the first five months of 1939 and 6943 in the same period of 1938. Further comparisons follow:

	1941	1940	1939	1938
Jan.....	15,169	360	3	25
Feb.....	5.508	1,147	2,259	109
March...	8,074	3,104	800	680
April....	14,645	2,077	3,095	15
May.....	18,630	2,010	2,051	6,014
5 mos....	62,026	8,698	8,208	6,943
June	.....	7,475	1,324	1,178
July.....	.....	5,846	110	0
Aug.....	.....	7,525	2,814	182
Sept.....	.....	9,735	23,000	1,750
Oct.....	.....	12,195	19,634	2,537
Nov.....	.....	8,234	2,650	1,232
Dec.....	.....	7,181	35	2,581
Total ..	.....	66,889	57,775	16,303

Car and locomotive builders are becoming well sold, and in absence of priority rating for steel material are having difficulty meeting schedules. Consideration by OPM has not yet resulted in carbuilding material being given preference. However, mills recognize need for additional rolling stock and are shipping plates and other steel products as liberally as possible.

CAR ORDERS PLACED

Baltimore & Ohio, 1000 box cars, to Pullman-Standard Car Mfg. Co., Chicago.

Elgin, Joliet & Eastern, 250 gondolas to American Car & Foundry Co., New York, 250 hoppers to Ralston Steel Car Co., Columbus, O.

Great Northern, 2000 fifty-ton box cars; 1000 to Pullman-Standard Car Mfg. Co., Chicago, 500 to General American Transportation Co., Chicago, 500 to Pressed Steel Car Co., Pittsburgh.

Kansas City Southern, 200 box cars, to Pullman-Standard Car Mfg. Co., Chicago.

Lehigh & New England, 100 seventy-ton bulk cement covered hoppers, to American Car & Foundry Co., New York; 300 fifty-ton hoppers to Pressed Steel Car Co., Pittsburgh.

Lehigh Valley, 500 tons, 400 fifty-ton box cars to Pressed Steel Car Co., Pittsburgh, and 100 fifty-five-ton steel-sheathed wood lined automobile cars to American Car & Foundry Co., New York.

Maine Central, 10 seventy-ton covered hoppers to American Car & Foundry Co., New York; 400 forty-ton box cars to Magor Car Corp., Passaic, N. J.; 100 fifty-ton hoppers to Bethlehem Steel Co., Bethlehem, Pa.

Missouri Pacific, 800 fifty-ton box cars, to American Car & Foundry Co., St. Louis shops; 200 fifty-ton automobile cars and 50 seventy-ton hopper cement cars, to Mount Vernon Car Co., Mount Vernon, Ill.

Norfolk & Western, 1000 seventy-ton hoppers, to Virginia Bridge Co., Roanoke, Va.; 500 to Bethlehem Steel Co., Bethlehem, Pa.

Western Maryland, 725 cars; 300 hoppers to Bethlehem Steel Co., Bethlehem, Pa.; 200 gondolas and 25 flats to Greenville Steel Car Co., Greenville, Pa.; 200 box cars to Pressed Steel Car Co., Pittsburgh.

Western Pacific, 350 box cars, 300 flat cars, to Mount Vernon Car Mfg. Co., Mount Vernon, Ill.

CAR ORDERS PENDING

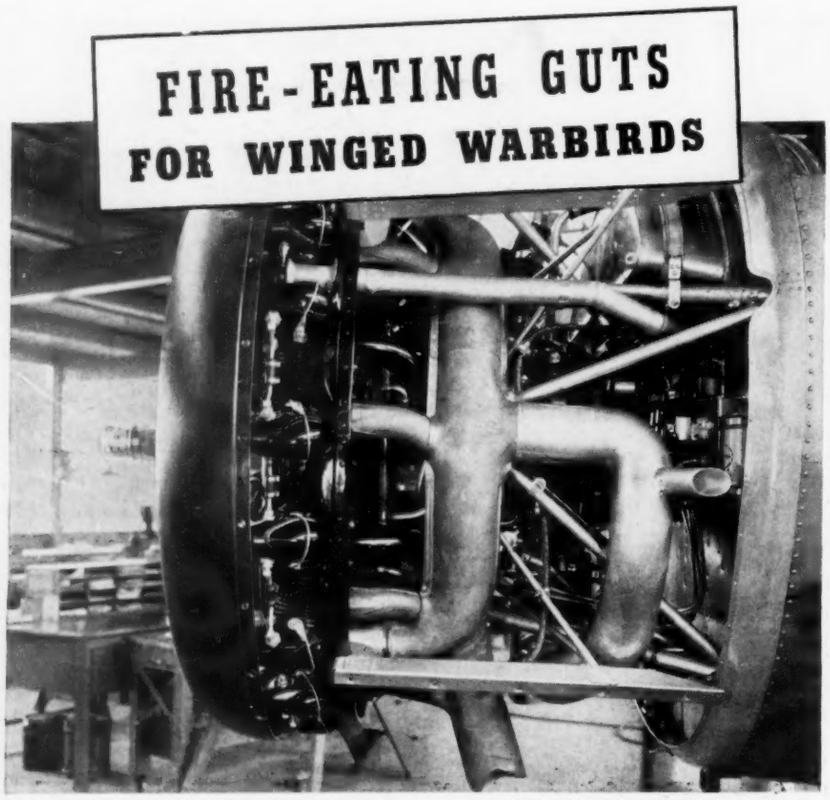
Chicago & Eastern Illinois, 500 fifty-ton box cars; bids asked.

Chicago Rapid Transit Co., 250 triplex cars, comprising 750 articulated bodies; bids July 7.

Contracting officer, chief of engineers, army, Washington, 50 tank cars, 10,000-gallon capacity with type AB freight car brakes; bids June 12, inv. 211.

Denver & Rio Grande Western, 100 seventy-ton flat cars; bids asked.

Gulf, Mobile & Ohio, 400 box cars and 150 fifty-ton hopper cars, bids asked;



Eating tongues of fire as hot as 1700°F. is no job for weak-stomached metals. That is what exhaust systems in Uncle Sam's new super-powered, high-speed warplanes do. And that is why aircraft designers rely on heat-resisting ARMCO Stainless Steels for these torturing tasks.

In exhaust systems these tough rustless metals resist hot, corrosive gases, cut maintenance costs and assure longer airworthy life.

Designers also specify ARMCO Stainless for fire walls, nacelles, tanks, floats, hulls, wing faring, ailerons, flare cans and ammunition-handling equipment. Light, though strong and rigid, ARMCO Stainless Steels form readily and are easily fabricated by the fast, economical spot-weld process.

Write for specific information on ARMCO Stainless Steels for aircraft applications. The American Rolling Mill Company, 2141 Curtis Street, Middletown, Ohio.

ARMCO STAINLESS STEELS

in addition to 500 box cars recently noted as pending.

Nashville, Chattanooga & St. Louis, 10 used parlor cars, to Pullman Co., Chicago, for conversion into day coaches.

New York Central, 1500; bids asked.

Sanderson & Porter Co., 50 fifty-ton box cars; pending.

Southern Pacific, 4000, comprising 2100 box cars, 500 auto box cars, 700 gondolas, 300 flats, 250 tank cars and 150 hoppers; bids asked.

LOCOMOTIVES PLACED

Conemaugh & Black Lick, two 0-8-0 type steam switchers to Lima Locomotive Works, Lima, O.

Kansas City Southern, two 2000-horsepower and two 1000-horsepower to Electro Motive Corp., La Grange, Ill.

Louisville & Nashville, twelve 660-horsepower diesel-electric locomotives, four each to American Locomotive Co., New York, Baldwin Locomotive Works, Philadelphia, and Electro Motive Corp., La Grange, Ill.

Nashville, Chattanooga & St. Louis, six diesel-electric switch engines; one 1000-horsepower and one 660-horsepower unit to Baldwin Locomotive Works, Eddystone, Pa.; one 1000-horsepower and one 660-horsepower, to Electro-Motive Corp., La Grange, Ill.; two 660-horsepower to American Locomotive Co., New York; orders for ten 4-8-4 type locomotives will be placed later.

United States Department of Interior, one 4-8-2 type locomotive for Alaska Railway, to Baldwin Locomotive Works, Eddystone, Pa.

LOCOMOTIVES PENDING

Argentina Naval Commission, one 2-8-2 type locomotive; pending.

Louisville & Nashville, 18 to 22 steam passenger locomotives.

Nashville, Chattanooga & St. Louis, ten 4-8-4 locomotives.

New York, Chicago & St. Louis, 15 2-8-4 type locomotives; pending.

Structural Shapes

Structural Shape Prices, Page 110

Among the various forms of building steel, in order of promptness of delivery, stand mesh, reinforcing bars and structural steel. There is thus the tendency to switch from structurals to more plentiful forms where possible. Bridge construction plays a more important role for the moment, with grade elimination prominent in some state projects, interesting because it is not strictly defense work, though Washington is reported as looking with favor on engineering projects which make for mobility of armed forces.

In the East construction tonnage now being estimated is almost entirely devoted to defense expansions. Additional contract for extensions at the Quonset Point, R. I., naval base is outstanding. Assembly shops and storage buildings will be erected, Quonset to serve as a fabricating and assembly center for construction units to be built at the Atlantic bases acquired from Great Britain. Contract for the expanding assembly base has been placed with George A. Fuller Co. and Merritt-Chapman & Scott, joint contractors, who had the original Quonset contract and who also have the Newfoundland award. Special assembly crews will be trained to travel with the thousands of tons of steel involved in shipments and re-assembly units at the advance Atlantic bases.

Sales of fabricated shapes in April totaled 211,301 tons, largest since January when 281,235 tons were booked, according to the American Institute of Steel Construction, New York. Sales in March were 206,072 tons. Sales for first four months were 872,167 tons, about 75 per cent of the business for the like period of 1929.

Shipments in April were 176,594 tons, against 170,161 tons in March and were the largest this year. They compare with 116,317 tons in April of last year. Shipments for four months were 672,699 tons, against 420,308 tons for the same period of 1940. Business on hand, scheduled for delivery within the next four months, on May 1 stood

SHAPE AWARDS COMPARED

	Tons
Week ended June 7	21,577
Week ended May 31	11,725
Week ended May 24	40,611
This week, 1940	16,137
Weekly average, 1941	32,691
Weekly average, 1940	28,414
Weekly average, May, 1941	29,872
Total to date, 1940	416,030
Total to date, 1941	751,891

Includes awards of 100 tons or more.

You'll set more Rivets per hour-per man with Hanna Squeeze RIVETERS

Directly above is a new Hanna Alligator Riveter — a design which allows both driving and stationary jaws to enter restricted areas. This model has a 15 in. reach, 9 in. gap, and exerts 50 tons on the rivet when operated at 100 lbs. air pressure.

EVERY RIVET SET WITH A PREDETERMINED UNIFORM PRESSURE—*ONE STROKE PER RIVET!*

THE use of Hanna Squeeze Riveters is a proved shortcut to greater production efficiency wherever riveting is used. Why?—because each piston stroke of a Hanna drives a rivet TIGHT, completely filling the hole and pulling plates tightly together. This accuracy and efficiency, plus the high operating speed of Hanna Riveters assures more rivets per hour per man, independent of skill or experience. Let us discuss your riveting problems with you — there's no obligation. Write for further details.

OVER 700 STYLES and SIZES to Squeeze RIVETS HOT or COLD!

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1765 ELSTON AVENUE • CHICAGO, ILLINOIS
Air & Hydraulic RIVETERS • CYLINDERS • Air HOISTS

at 741,882 tons, which would imply a delivery of 185,470 tons monthly over the next four months.

SHAPE CONTRACTS PLACED

26,000 tons, aircraft assembly plant, Consolidated Aircraft Corp., Tulsa, Okla., reported in STEEL, May 19, as awarded to Midland Structural Steel Co., Chicago, and to be divided among several fabricators as follows: 2600 tons each to Midland Structural Steel Co., Duffin Iron Co., Joseph T. Ryerson & Son Inc., Gage Structural Steel Co., all of Chicago, and Clinton Bridge Works, Clinton, Iowa; 3250 tons each to Patterson Steel Co., Tulsa, Okla., Tulsa Boiler & Machinery Co., Tulsa, Okla., Muskogee Iron Works, Muskogee, Okla., and J. B. Klein Iron & Foundry Co., Oklahoma City, Okla.; bids April 25.

3264 tons, ordnance depot, Anniston, Ala., 1344 tons, Southern Steel Co., Birmingham; 1920 tons, Ingalls Iron Works, Birmingham; Dunn Construction Co., Inc. and John S. Hodgson & Co., Anniston, joint contractors; additional contracts to be placed, including reinforcing.

1800 tons, additional warehouses, Hill Field, Ogden, Utah, to Kansas City Structural Steel Co., Kansas City, Kans.

1700 tons, Brooklyn tunnels, Brooklyn-Battery tunnels, New York, to Bethlehem Steel Co., Bethlehem, Pa.; George H. Flynn, Inc., New York, contractor.

1600 tons, concentrating plant, National Lead Co., North Creek, N. Y., to Belmont Iron Works, Eddystone, Pa.

1500 tons, duPont neoprene plant, Louisville, Ky., to Virginia Bridge Co., Roanoke, Va.

1200 tons, lift-bridge, Southern Pacific Co., Lathrop, Calif., to Columbia Steel Co., San Francisco.

1000 tons, additions, diesel engine shops, American Locomotive Co., Schenectady, N. Y., to American Bridge Co., Pittsburgh.

866 tons, Ohio state project 37, bridges for grade elimination, Richland county, to American Bridge Co., Pittsburgh; Lombardo Construction Co., Cleveland, contractor.

600 tons, engine storage warehouse, government airfield, Middletown, Pa., to Pittsburgh Bridge & Iron Works, Rochester, Pa.

545 tons, Wawarme and Van Dyke avenue bridges, state projects, direct bids, Hartford, Conn., to Bethlehem Steel Co., Bethlehem, Pa.

510 tons, grade crossing bridge, Lemoyne, O., for state, to American Bridge Co., Pittsburgh.

500 tons, Erie railroad bridge, Mansfield, O., for state, to American Bridge Co., Pittsburgh.

475 tons, shop, Hoffman-La Roche Inc., Nutley, N. J., to Lehigh Structural Steel Co., Allentown, Pa.

450 tons, Cherro Creek bridge, San Luis Obispo county, California, to Bethlehem Steel Co., San Francisco.

450 tons, state bridge 59-A, Lake Forest, Ill., to American Bridge Co., Pittsburgh; bids May 9.

450 tons, including 300 tons in artillery primer line and 150 tons in black powder pellets line, Kingsbury ordnance plant, Laporte, Ind., for government, to Mississippi Valley Structural Steel Co., Decatur, Ill.; Bates & Rogers Construction Corp., Laporte, Ind., contractor.

400 tons, state bridge, Baltimore & Ohio railroad, Mansfield, O., to American Bridge Co., Pittsburgh.

350 tons, telephone building, San Francisco, to Moore Drydock Co., Oakland, Calif.

350 tons, state bridge, contrat 2165, Farmland, Ind., to Pan-American Bridge Co., New Castle, Ind.

320 tons, grade elimination bridges, Scioto county, Ohio, at Franklin Furnace, in connection with Norfolk & Western railroad, to Fort Pitt Bridge Works, Pittsburgh.

315 tons, Folly Brook boulevard project, U. S. route 5, direct bids, state project, Wethersfield, Conn., to Harris Structural Steel Co., New York.

311 tons, state highway bridge, Falls City, Neb., to Capitol Bridge Co., Lincoln, Neb.

280 tons, two cutters, ice-type breaker, to Birchfield Boiler Works, Tacoma, Wash.

250 tons, land plane hangars, naval air station, Corpus Christi, Tex., to Austin Bros., Dallas, Tex.

210 tons, building addition, New York Telephone Co., Schenectady, N. Y., to American Bridge Co., Pittsburgh.

208 tons, piling, naval air station, Brown Bellows Columbia, Corpus Christi, Tex., to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, Orchard Park housing project, Roxbury district, Boston, to Phoenix Bridge Co., Phoenixville, Pa.; M. S. Kelliher Co., Boston, contractor.

185 tons, building, Sweets Co. of America, Hoboken, N. J., to Hudson Structural Steel Co., Jersey City.

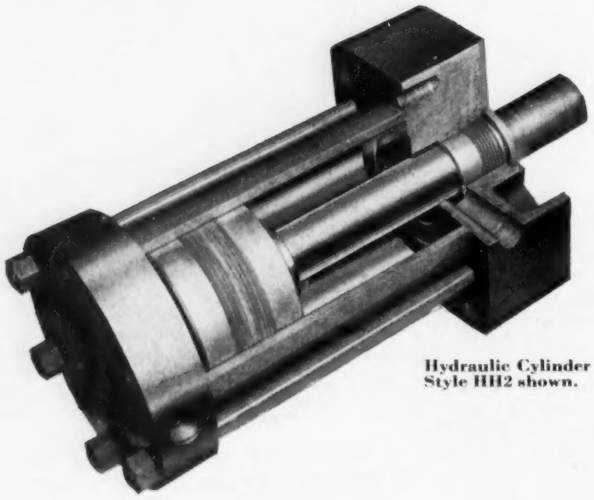
180 tons, bridge, Baltimore & Ohio railroad, Eighty-Four, Pa., for state, to American Bridge Co., Pittsburgh.

175 tons, disposal plant No. 5, Cheektowaga, N. Y., to Buffalo Steel Co., North Tonawanda, N. Y., through C. E. Knowles, Gowanda, N. Y.

160 tons, power house, Pacific Gas & Electric Co., Dutch Flat, Calif., to Herrick Iron Works, Oakland, Calif.

150 tons, bridge, Columbia county, Pennsylvania, to Fort Pitt Bridge Works.

there's a lot of difference in cylinders . . .



Hydraulic Cylinder Style HH2 shown.

Cylinders must be built not only to resist wear but to exert the maximum amount of power that a given bore cylinder operating at a given pressure per square inch—can theoretically exert. This gets all there is out of the compressed air or hydraulic pressure supplied.

To do this, T-J Cylinders use low friction factor leathers that at the same time provide an effective seal. ***T-J Air Cylinders when used at 80 lbs. pressure p.s.i. and T-J Hydraulic Cylinders when used at from 500 to 1500 lbs. pressure p.s.i. perform at an average mechanical efficiency of 95%.***

We will gladly go over the construction features of these cylinders with you . . . representatives in principal cities.

THE TOMKINS-JOHNSON CO., 611 N. Mechanic Street, Jackson, Michigan.

this is a **TOMKINS-JOHNSON** *product*

Pittsburgh.

135 tons, building, General Electric Co., Schenectady, N. Y., to Lehigh Structural Steel Co., Allentown, Pa.

130 tons, ordnance building, Pedericktown, N. J., to Schact Steel Construction Co., New York, through Harry Herschon Co., New York.

125 tons, bridge, New Haven railroad, Cranston, R. I., to American Bridge Co., Pittsburgh; C. V. Blakeslee Co., New Haven, Conn., contractor.

125 tons, addition, Jefferson office building, Illinois Bell Telephone Co., Peoria, Ill., to Bethlehem Steel Co., Bethlehem, Pa.

108 tons, state bridge route FA-31, section 59-SF, Warrenhurst, Ill., to American Bridge Co., Pittsburgh; bids May 9.

SHAPE CONTRACTS PENDING

10,000 tons, two dry docks, Brooklyn navy yard, New York; Associated Contractors for Dry Docks Inc., contractors, involving Steers, Walsh, Cauldwell-Wingate and Raisler interests, New York; also 1000 tons corrugated galvanized sheets and large tonnages of reinforcing bars and piling; contractors taking bids.

1600 tons, piling, flood wall, Cairo, Ill., U. S. engineer; bids June 5.

1500 tons for bomber plant at Memphis, Tenn.; bids June 4.

910 tons, highway overpass, overall 889.5 feet and approaches, U. S. route 5, Portland street, St. Johnsbury, Vt.; bids June 13, H. E. Sargent, commissioner of highways, Montpelier.

900 tons, bent section and plaza, MHT-55, Lincoln tunnel, New York, for city.

800 tons, three drum gates, spec. 963, Friant dam, California, for Bureau of Reclamation.

607 tons, Mill Creek pumping station and appurtenant works, contract 2, bids July 9, U. S. engineer, Cincinnati; also large tonnage of sheet piling and miscellaneous metal.

600 tons, state bridge, Barren river, Warren county, Kentucky.

600 tons, hangar, LaGuardia field, New York; rebid June 12 for contractor.

500 tons, addition, transit shed, navy department, Bayonne, N. J.

450 tons, buildings, American Brass Co., Kenosha, Wis.

425 tons, three manufacturing buildings, Hoffman-La Roche Inc., Nutley, N. J.

350 tons, bleacher stands, high school, Mt. Lebanon, Pa., for Board of Education.

300 tons, Pennsylvania railroad underpass on Main avenue, Washington.

275 tons, bridge crane girders, Philadelphia, for navy.

275 tons, bridge, navy yard, Portsmouth, N. H.; Vulcan Construction Co., Boston, low.

250 tons, flash roaster building, National Lead Co., St. Louis.

250 tons, addition, American Car & Foundry Co., Buffalo.

245 tons, bridge over New York, New Haven & Hartford railroad, Bird street, Boston; bids June 24, R. W. Coburn, chief engineer, department of public works, Boston.

232 tons, Santa Fe dam, San Gabriel River near Azusa, Calif.; bids opened.

225 tons, lock wall armor, Emsworth lock and dam, Ohio river, for army engineers.

200 tons, state bridge, Peterboro, N. H.

200 tons, library, University of Maine, Orono, Me.

200 tons, koroseal plant expansion, B. F. Goodrich Rubber Co., Niagara Falls, N. Y.

175 tons, plant addition, Lake Erie Engineering Corp., Tonawanda, N. Y.

150 tons, power house addition, Interstate Power Co., Dubuque, Iowa.

150 tons, warehouse, ordnance department, army, Pedricktown, N. J.

135 tons, repairs to bridges, Pennsylvania railroad, Pittsburgh.

125 tons, building addition, Chesapeake & Potomac Telephone Co., Alexandria, Va.

100 tons, overpass, route 1, Fairview, N. J., also 40 tons reinforcing; bids June 13, E. Donald Sterner, state highway commissioner, Trenton.

100 tons, Raccoon Creek bridge, Swedesboro, N. J., also 35 tons reinforcing; bids June 13, E. Donald Sterner, state highway commissioner, Trenton.

Unstated, 850 transmission towers, Coulee-Covington line; bids in to Bonneville project, Portland, June 6.

Unstated, 10-122 ft. and 133 ft. aerial towers and steel frame building, Missoula, Mont; bids to C. A. A., Washington, June 12.

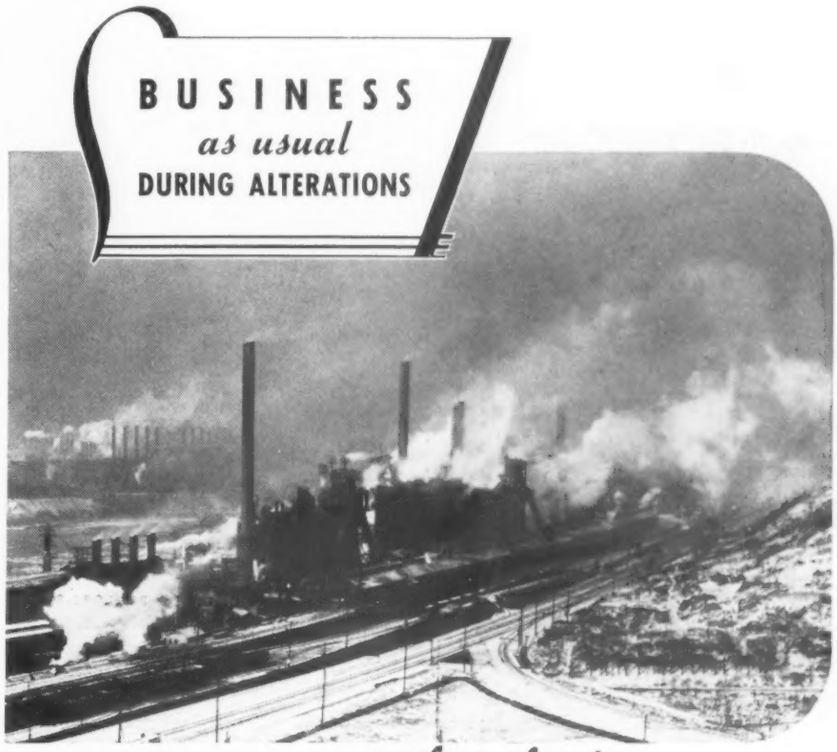
Ferroalloys

Ferroalloy Prices, Page 112

Ferroalloy consumers expect action with respect to third quarter prices within the next week. Costs of producers have unquestionably been increasing, particularly with respect to labor and raw materials but many believe the decision in the last analysis will be up to the price administrator in Washington.

Currently ferromanganese is holding at $120, duty paid, Atlantic and Gulf ports, and spiegeleisen, 19 to 21 per cent, at $36, Palmerton, Pa.

Shipments generally are moving at the highest rate this year, some sellers report.



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Engineers and Contractors

FIRST NATIONAL BANK BUILDING, PITTSBURGH, PA.

Reinforcing Bars

Reinforcing Bar Prices, Page 111

Mesh is more readily available in many centers than reinforcing bars, partly because manufacturing capacity has been built up heavily to take care of military roads, airfields and cantonments. Reinforcing bars at warehouses are badly depleted and builders must turn more frequently to mills, from which delivery of 12 weeks is decidedly favorable. Housing projects for defense workers are an important outlet, including 1900 tons of bars for Boston, where total pending work figures 10,000 tons. First inquiries for a drydock at Portsmouth, N. H., are about to be issued.

REINFORCING STEEL AWARDS

2000 tons, pier, Puget Sound navy yard, to Bethlehem Steel Co., Seattle; A. W. Quist and Sound Construction & Engineering Co., Seattle, contractors.

2000 tons, two shipways, William Cramp, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.; Turner Construction Co., contractor.

1900 tons, Orchard park housing project, Roxbury district, Boston, to Truscon Steel Co., South Boston, Mass.; M. S. Kelliher Co., Boston, contractor.

1275 tons, extensions and alterations, West-Southwest Sewage treatment works, division J, Stickney, Ill., for city of Chicago, to Joseph T. Ryerson & Son Inc., Chicago; E. J. Albrecht Co., Chicago, contractor; bids May 22.

900 tons, building, navy yard, South Boston, Mass., to Joseph T. Ryerson & Son Inc., Cambridge, Mass.; Thomas O'Connor Co., Boston, contractor.

600 tons, Brooklyn section, Brooklyn-Battery tunnel, New York, to Bethlehem Steel Co., Bethlehem, Pa., through George H. Flynn Inc., New York, contractor.

387 tons, powder igloos, powder bagging plant, Goodyear Engineering Co., Charlestown, Ind., to Truscon Steel Co., Youngstown, O.; Winston Bros. and C. F. Haglin & Sons Inc., joint contractor.

379 tons, sewage treatment plant, Rocky Mount, N. C., to Virginia Steel Co., Richmond, Va.; V. B. Higgins Co., Greensboro, N. C., contractor; Greenville Steel & Foundry Co., Greenville, N. C., awarded 40 tons structural steel.

300 tons, bars and mesh, highway project, bridge-viaduct, Hartford, Conn., to Concrete Steel Co., Boston.

300 tons, plant, Cleveland Graphite Bronze Co., Cleveland, to Republic Steel Corp., Cleveland, through Paterson-Leitch Co., Cleveland; Albert M. Higley, contractor.

284 tons, 16 powder bagging units, powder bagging plant, Goodyear Engineering Corp., Charlestown, Ind., to Joseph T. Ryerson & Son Inc.; bids May 28.

265 tons, mostly mesh, highway project, route 4, Sect. 1B, South Amboy to Cheesequake, N. J., to Truscon Steel Co., Youngstown, O., through C. F. Malanka & Sons Inc., Union City, N. J., contractor.

264 tons, plant addition, Chicago Screw Co., Chicago, to Ceco Steel Products Corp., Chicago.

235 tons, paving, Center county, Pennsylvania, to Bethlehem Steel Co., Bethlehem, Pa.; H. J. Williams, York, Pa., contractor.

200 tons, Yakima, Wash. jail, and miscellaneous road work, to Northwest Steel Rolling Mills, Seattle.

200 tons, sausage manufacturing building, Swift & Co., St. Paul, to Truscon Steel Co., Youngstown, O.; Paul Steenberg, St. Paul, contractor; bids May 12.

200 tons, power house, Standard Oil Co. of Indiana, Wood River, Ill., to Laclede Steel Co., St. Louis; Dravo Corp., contractor.

189 tons, science building, Northern Illinois State Teachers College, De Kalb, Ill., to Joseph T. Ryerson & Son Inc., Chicago; W. H. Franklin Co., Springfield, Ill., contractor.

175 tons, disposal plant, Cheektowaga, N. Y., to Buffalo Steel Co., Buffalo; C. E. Knowles Co., Gowanda, N. Y., contractor.

175 tons, mesh, highway project, Union, Conn., to American Steel & Wire Co., New York; Oneglia & Gervasini, Inc., Torrington, Conn., contractor.

165 tons, paving, Lancaster and Berks counties, Pennsylvania, to Bethlehem Steel Co., Bethlehem, Pa.; Hentt Bros., Harrisburg, contractors.

CONCRETE BARS COMPARED

	Tons
Week ended June 7	13,653
Week ended May 31	11,343
Week ended May 24	6,242
This week, 1940	14,920
Weekly average, 1941	11,849
Weekly average, 1940	9,661
Weekly average, May, 1941	10,521
Total to date, 1940	191,810
Total to date, 1941	272,325

Includes awards of 100 tons or more.

AVOID DELAY

IN FURNACE CONSTRUCTION

Use Refractory Concrete!

...It is available and adaptable

YOU can get the materials for Refractory Concrete and Refractory *Insulating* Concrete *now*—or whenever you want them. Refractory Concrete is made with LUMNITE as the binder for refractory aggregates. LUMNITE is sold by building supply dealers throughout the United States and in Canada. Aggregates *can be easily obtained or prepared in your plant.*

Added to availability is the adaptability of Refractory Concrete and Refractory *Insulating* Concrete. *This also eliminates delay.* Cast-in-place Refractory Concrete is formed to fit the job. Any thickness or shape of wall or arch can be placed without limitation by the size of masonry units, without cutting, and without waiting for special shapes.

High cold-strength speeds up the construction schedule. Refractory Concrete is ready for service in short order, usually before installation of burners and accessories is completed. *You do not have to wait for Refractory Concrete.*

Pre-cast units of Refractory Concrete can be made in your plant, ready for installation as needed. Special shapes, made in any form desired, can be stored or installed the day after molding—without pre-firing.

Let us tell you where you can get LUMNITE and aggregates for Refractory Concrete and Refractory *Insulating* Concrete. Write Atlas LUMNITE Cement Co. (United States Steel Corp. Subsidiary), Dept. S-15, Chrysler Building, New York City.

Keep LUMNITE Castables in Stock—

if you prefer a factory-prepared mixture. Made with LUMNITE and selected aggregates, these castables are ready for use upon mixing with water. With LUMNITE castables you can have Refractory Concrete or Refractory Insulating Concrete in minimum time. LUMNITE Castables are obtainable from refractory manufacturers and distributors in all parts of the United States and Canada.

▶ Specify Castables "Made with LUMNITE" ◀

LUMNITE FOR REFRACTORY CONCRETE

160 tons, state highway construction, route 51, section 102-Y, Justis Park, Ill., to Bethlehem Steel Co., Bethlehem, Pa.; John A. McGarry Co., Chicago, contractor.

155 tons, paving, Chester county, Pennsylvania, to Bethlehem Steel Co., Bethlehem, Pa.

150 tons, Covington, Wash., power substation, Bonneville project, to Seattle Steel Co., Seattle.

150 tons, shop addition, Allis-Chalmers Mfg. Co., West Allis, Wis., to Joseph T. Ryerson & Son Inc., Chicago.

150 tons, DeSota-Bass housing, Dayton, O., to West Virginia Rail Co.; Knowlton Construction Co., contractor.

150 tons, state hospital reception buildings, Deer Park, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

125 tons, mesh, highway project, route 25, section 7B, Rahway, N. J., to Woodbridge and Cloverleaf, N. J., to Stulz-Sickels Co., Newark, through Thomas Gallo, Irvington, N. J., contractor.

120 tons, colored housing project, Portsmouth, O., to West Virginia Rail Co.; C. A. Yeager & Co., contractors.

100 tons, flood dike extension, East Hartford, Conn., U. S. engineer, to Truscon Steel Co., Youngstown, O.; A. I. Savin Construction Co., contractor.

REINFORCING STEEL PENDING

15,000 tons, drydocks, navy yard, Brooklyn, N. Y.; J. Rich Steers, Walsh Construction Co., and Cauldwell-Wingate, combined contractors.

5975 tons, earthfilled dam on San Gabriel River near Azusa, Calif.; bids opened.

5000 tons, superstructures, Fort Green housing project, Brooklyn; bids June 10.

2500 tons, arsenal warehouse, Rock Island, Ill.; bids June 14.

2250 tons, Mill Creek pumping station, contract 2; bids July 9 to U. S. engineer, Cincinnati.

1800 tons, state highway project, route No. 16, East Aurora to Holland; Holmes & Murphy, Orchard Park, N. Y., contractors.

1400 tons, housing project, East Boston, Mass.; John Bowen Co., Boston, low.

1000 tons, Panama, schedule 5168; bids June 9, Washington.

900 tons, generating plant, Boston Edison Co., Everett, Mass.; Thos. O'Connor & Co., contractors.

860 tons, including 200 tons of mesh, Brooklyn section, Battery-Brooklyn tunnel, New York; George F. Flynn, Inc., New York, low.

800 tons, storehouse, navy yard, Boston; Thos. O'Connor & Co., contractors.

800 tons, quay and retaining wall, Puget Sound navy yard, Wash.; General Construction Co., Seattle, low.

800 tons, plane engine test building, Studebaker Corp., South Bend, Ind.; bids June 10.

550 tons, consisting of 320 tons of bars and 230 tons of mesh, warehouse, Rock Island arsenal, Rock Island, Ill.; bids June 14; alternate proposal, all reinforced concrete construction, 2500 tons of bars and 230 tons of mesh.

500 tons, sewage plant, WPA 56385, Carbondale, Ill.; inquiry canceled and readvertised as WPA 56528 for 50 tons.

400 tons, Outhwaite housing project, Cleveland.

300 tons, brass rolling mill, Revere Copper & Brass Inc., Chicago; James Stewart Corp., Chicago, contractor.

165 tons, silos, Annville, Pa.; E. C. Machin Co., Allentown, Pa., contractor.

163 tons, flood wall, Evansville, Ind., for U. S. government.

160 tons, East river drive, contr. 6, New York; bids June 9.

154 tons, highway overpass, U. S. route 5, Portland street, St. Johnsbury, Vt.; bids June 13, H. E. Sargent, commissioner of highways, Montpelier.

150 tons, grain elevator, Superior, Wis.

150 tons, paving, Milwaukee avenue, city of Chicago; bids June 18.

110 tons, mesh, highway project route 33-35, sections 1A and 2, Monmouth county, New Jersey; bids June 13, E. Donald Sterner, state highway commissioner, Trenton.

103 tons, Beshee ditch pumping station, Brevort levee improvement, Vincennes, Ind.; Snyder Construction Co., Vincennes, low.

Unstated, Oregon state contracts, including approaches to Morrison street bridge, Portland, 182-foot viaduct Lincoln county, and projects in Grant and Tillamook counties; bids to Portland June 12-13.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 111

Makers of bolts, nuts, rivets and similar products are hard pressed to meet deliveries and orders are being increasingly limited to defense work. One eastern maker has adopted the policy of booking nothing for other purposes. Considerable tonnage for commercial consumers is on books and it is believed much of this will be greatly delayed, if not entirely superseded by priority material.

Defense inquiry is heavy and producers have difficulty meeting delivery requirements in many instances. Commercial inquiry is increasing and this is attributed to

Wire Cloth can cost you much or little—depending on the service you receive from it.

A screen which delivers 50 tons per hour and lasts one week may be less expensive than one which lasts for years but delivers only 25 tons per hour. This is true where labor costs are constant, and production output depends upon efficient and rapid separation.

However, a screen of great capacity may *cost you money* where labor costs are not constant and where production rate does not depend upon the screen itself.

MORAL: Each screen problem is individual and can best be solved by a manufacturer of experience. He can save you money by giving you the *right* screen for the *right* job—made *right* from start to finish.

The Buffalo Wire Works Company has this experience. For over seventy years it has specialized in the manufacture of *industrial* wire cloth. *You* need the benefits of *this* experience in your plant *today*.

SEND FOR NO. 11-S WIRE CLOTH MANUAL

BUFFALO WIRE WORKS CO., INC.

(Established 1869 as Scheeler's Sons)

437 TERRACE BUFFALO, N. Y.

efforts to cover further ahead than normally.

Washer manufacturers have lowered discounts to $4.50 off list. Most sales are on the basis of price in effect at delivery. Some difficulty is experienced in obtaining material for washers.

Pig Iron

Pig Iron Prices, Page 112

Bookings of pig iron now being accepted are practically all for third quarter delivery, at prices in effect at time of delivery. No announcement of prices has been made and it is believed by many that no change from present levels will be made. Most producers limit sales to regular customers and in quantities relative to normal consumption. This prevents accumulation by melters and the inventory report system is relied on to maintain this position as soon as it goes into effect.

May shipments were heavy and in many instances furnaces shipped much in excess of production. A New England interest delivered about 10,000 tons more than it made, without adding to consumer inventory, as foundries have light stocks and frequent small lots are needed to fill gaps. Inasmuch as foundries in that area probably will need all available iron there is less tendency to sell outside the district on an f.o.b. basis.

In spite of the tight situation prevailing generally foundries have been supplied for all needs and no real distress has resulted. Furnaces have been caring for regular customers as needs arose. In most cases foundries are consuming more iron than normally as defense requirements increase.

Some changes have taken place in methods of pricing. In southern Ohio No. 2 northern foundry iron is no longer regarded as competitive with southern iron but takes full Hamilton, O., base plus freight. No merchant iron has been made in that district for several weeks and contracts are being filled by resale iron.

Pig iron production is being enlarged by addition of idle furnaces. The Swedeland, Pa., furnace of Alan Wood Steel Co. will be returned to production within a few days after relining. Hanna Furnace Co. has lighted its No. 1 stack at Buffalo after being idle since 1929.

Scrap

Scrap Prices, Page 114

Scrap supplies in most consuming districts are tight and mill reserves are being depleted by the high rate of consumption. Melters in need of tonnages are willing to accept single cars. Collection from outlying areas is on a much smaller scale than normally. Dealers assert one reason is that labor has been diverted to occupations that pay better. Railroad offerings are also much less than usual, the carriers apparently using equipment longer than usual instead of scrapping old cars and locomotives.

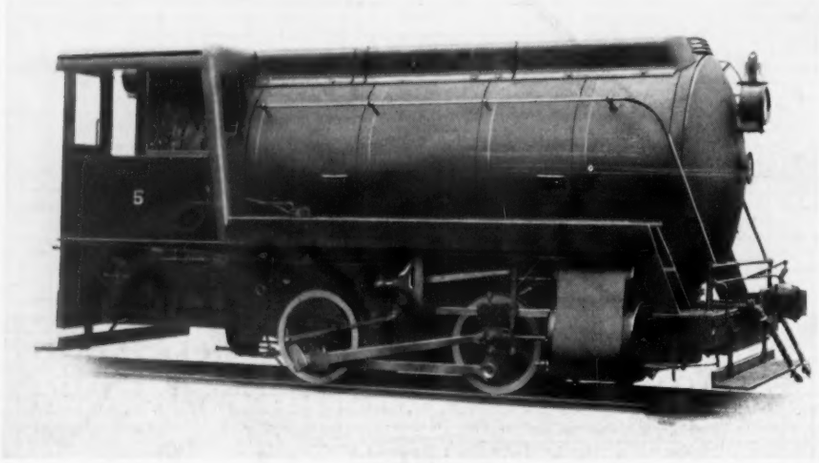
Brokers believe some change will be made in maximum prices to encourage collections and many contracts are being written with provision for cancellation if governmental action changes prices, as protection against loss.

Considerable dislocation in usual avenues of scrap movement has taken place unde the new price schedule and scrap from some areas is moving to consumers in districts not usually served, causing shortages elsewhere. An example is shipment from the Southwest to the East, depriving midwestern consumers of material usually available to them.

The situation is improving somewhat as better understanding is obtained of the government regulations, though many points still remain unsettled and impose restraint on movement. For the most part ceiling prices are being paid and quotations below these levels are the exception.

Automobile companies at Detroit will have normal scrap lists through July, according to present indications, but the outlook after August 1 is not clear. Strike at Great Lakes Steel Corp. plant at Detroit has not interfered with scrap shipments to that consumer, as blast furnaces and open hearths were not involved.

The practice of shipping and ac-



Here are Savings..

Made possible by Porter Fireless Locomotives

★ **"With two Fireless Locomotives we are saving 65% in hauling ingots at our open hearth furnaces."—Tube Mill**

★ **"We are operating the Fireless at about half the cost of our old engine."—Tie Treating Plant**

★ **"By doing our own switching with a Fireless we are saving $2,760 per year."—Machine Tool Manufacturer.**

Above are three actual statements from more-than-satisfied Porter customers. Similar savings are being reported by users of Porter Fireless Steam Locomotives throughout the country.

LOW INITIAL COST because no diesel, electric or other motors are necessary . . . **LOW OPERATING COST** because steam produced in stationary boilers is used . . . **LOW MAINTENANCE COST** because there are fewer wearing parts, no boiler or firebox . . . all these are reasons why a Porter Fireless can do your job for less. Add cleanliness, quiet operation and freedom from fire hazards and you have everything desirable in a locomotive. Write for additional information on Porter Fireless Locomotives.

ONLY PORTER BUILDS A COMPLETE LINE OF LOCOMOTIVES FOR INDUSTRY

PORTER better built locomotives

H. K. PORTER COMPANY, INC.

PITTSBURGH • PENNSYLVANIA

NEW YORK 44 Whitehall St CHICAGO 310 So. Michigan Ave.

Nonferrous Metal Prices

May	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
31	12.00	12.00	12.25	52.20	52.00	5.85	5.70	7.25	17.00	14.00	35.00
June											
2	12.00	12.00	12.25	52.25	52.00	5.85	5.70	7.25	17.00	14.00	35.00
3	12.00	12.00	12.25	52.12½	52.00	5.85	5.70	7.25	17.00	14.00	35.00
4	12.00	12.00	12.25	52.20	52.10	5.85	5.70	7.25	17.00	14.00	35.00
5	12.00	12.00	12.25	52.25	52.12½	5.85	5.70	7.25	17.00	14.00	35.00
6	12.00	12.00	12.25	52.62½	52.50	5.85	5.70	7.25	17.00	14.00	35.00

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 12.00c Conn. copper

Sheets

Yellow brass (high)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	9.10
Zinc, 100 lb. base	12.50

Tubes

High yellow brass	22.23
Seamless copper	21.37

Rods

High yellow brass	15.01
Copper, hot rolled	17.37

Anodes

Copper, untrimmed	18.12

Wire

Yellow brass (high)	19.73

OLD METALS

Nom. Dealers' Buying Prices

No. 1 Composition Red Brass

New York	9.25
Cleveland	9.50-10.00
Chicago	9.00-9.25
St. Louis	9.00

Heavy Copper and Wire

New York, No. 1	10.25-10.37½
Cleveland, No. 1	10.00-10.50
Chicago, No. 1	10.00-10.25
St. Louis	10.00

Composition Brass Turnings

New York	9.00

Light Copper

New York	8.25-8.37½
Cleveland	8.00-8.50
Chicago	8.00-8.25
St. Louis	8.00

Light Brass

Cleveland	4.50-5.00
Chicago	6.25-6.50
St. Louis	5.00

Lead

New York	4.85-5.00
Cleveland	4.75-5.00
Chicago	4.75-5.00
St. Louis	4.50

Old Zinc

New York	4.50
Cleveland	4.00-4.12½
St. Louis	5.00

Aluminum

Mis., cast	11.00
Borings, No. 12	9.50
Other than No. 12	10.00
Clips, pure	13.00

SECONDARY METALS

Brass ingot, 85-5-5-5, l. c. l.	13.25
Standard No. 12 aluminum	16.00

cepting mixed scrap is becoming more general. For example, shipments of No. 1 heavy melting steel adulterated with part iron of No. 2 are being freely made and accepted despite the fact that such transactions would appear to come under the head of violation of the OPACS price ceiling order. Shipment and acceptance of scrap of lower grade than specified is a direct result of the fact that there is not enough to go round. With sharp competition dealers are taking advantage of the situation and favor consumers who will accept mixed scrap and other consumers have to be equally lenient. Buyers confronted with dwindling inventories are forced to consider the matter of procurement first.

Word from Washington is that changes in steel and iron scrap prices to give melters in some consuming regions easier access to supplies are being considered by OPACS. It is said the revisions will cover several grades and are expected to vary by a few cents from present levels. Complaints had been made that the original schedule discriminated against some localities.

Nonferrous Metals

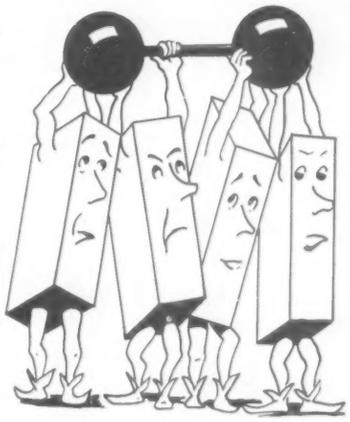
New York — Priority control of nonferrous metals is being widened and even more drastic control is to be expected. Defense requirements are taking an increasingly large portion of available supplies.

Copper—Effective June 1, a ton-

"WHEN 1 ARMSTRONG'S BRICK DOES THE WORK OF 4 FIRE BRICK . . . THAT'S EFFICIENCY!"

SURE I'm proud—I'm an efficient Armstrong's Insulating Fire Brick, and I *can* do the work of four regular fire brick. Here's what I mean:

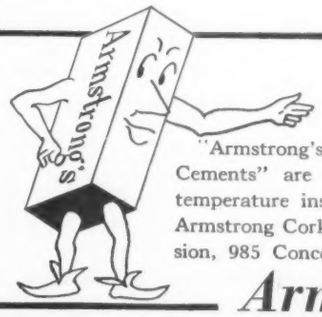
To begin with, I'm light in weight but designed both for insulating efficiency and to give lasting service. I have ample strength to withstand shipping and handling bumps and I can be used either for backing up or directly exposed to hot furnace gases.



Engineers take full advantage of my efficiency and strength to simplify furnace design. They use thinner walls, reduce quantities of refractories, and save weight throughout the job when I'm included.

Then, too, I store a lot less heat than regular fire brick—less than one tenth as much in many cases—I can heat up and cool off almost ten times as fast as fire brick and that saves a lot of valuable time on batch operations.

I'm made in five classes for temperatures up to 2600° F. In standard sizes I may be notched, grooved, and shaped with a saw or rasp right on the job, making it unnecessary to keep a stock of special shapes for repairs.



"YOU'LL WANT THESE TWO NEW BOOKS"

"Armstrong's Insulating Fire Brick" and "Armstrong's Cements" are fact-filled booklets about Armstrong's high temperature insulation line. For free copies write to Armstrong Cork Company, Building Materials Division, 985 Concord Street, Lancaster, Pennsylvania.

Armstrong's

HIGH TEMPERATURE INSULATION

Color now aids the easy and accurate identification of the five types of Armstrong's Brick

Behind the Scenes with STEEL

Aye, Aye, Sir!

■ STEEL's machine tool editor, Guy Hubbard, is back home with that salt spray look after being first mate for a well-known machine tool builder who last week-end piloted his new cabin cruiser up through the Sound, the Canal and all the way to Portland. Guy had a swell time, despite the fact they couldn't find the blankets and darned near froze the first night out. And he makes a good story out of just being missed by an emerging submarine off Portsmouth, having been mistaken for a surface raider, or something.

Background of Steel

■ The circus streamlined its way into the Smoky City last week and took up its stand on Second Ave., where National Tube used to have a plant, having been forced by industrial progress to forsake its time-honored East Liberty St. lot. Last year, right after things had been packed and on their way, General Electric sneaked in and built a new warehouse right where Gargantua's cage stood. Now, with the big show nestled down among the steel mills, amateur as well as professional photographers were somewhat at a loss, because in Pittsburgh it is considered a major crime to photograph a steel mill in these defensive times.

Gone Soft

■ We understand by hearsay only that the circus has gone panty-waist on us and no longer will we be able to whiff the pungent odor of sawdust. This year it's treated to give off the odor of orange blossoms. And as further evidence of the soft state to which we have fallen, instead of human cannon-balls and gentlemen inserting their heads in the mouths of tigers, top billing on the posters will go to the romance of Gargantua and his lovely bride!

Light Heavy

■ Down in Pittsburgh, where the heavy end of the defense effort is being carried on, one company, at least, seems to be bucking the trend. In an atmosphere where special cars are being built to haul extra-heavy loads and everything is figured in big tonnages, this plant announces with little or no concern that it has just taken an order for 100,000 feather pillows!

Information, Please

■ A good subscriber wants to know what "card teeth" are. Our guesses are sort of wild; can you help out?

Boom Towns

■ Out around some of the new defense plants, like the Chrysler tank arsenal in Detroit, workmen's homes are springing up like dandelions in the spring sun. Several families are actually living in the basements of their new homes with upper walls and roofs yet to be erected. These strange living quarters suggest bomb shelters but would be scant protection against one of those whirling dervish Molotov breadbaskets.

Eyes Right

■ Have you noticed the increasing number of service men on the trains lately? Gives things sort of an incongruous look, despite all the talk of defense. All the boys we've seen appear uniformly clean-cut and cheerful, however, but, of course, have the customary X-Ray eyes for any cute young thing that happens to pass by.

First Hope, Now Rudy

■ A few weeks ago we mentioned Bob Hope's interest in a metalworking company here in Cleveland, and now we notice among some new incorporations just going onto our list, the Vis-O-Graph Corp. of America, who will manufacture coin-operated machines out in Hollywood. The president—of all people—is none other than Rudy (Stein Song) Vallee!

R. S. V. P.

■ Names with intrigue: *Van Rensselaer P. Saxe,* who this week tells how to save money in erecting structural steel on page 88.

SHRDLU.

nage amounting to 20 per cent of April production is being set aside for emergency requirements under provisions of a general preference order signed by E. R. Stettinius Jr., director of priorities. The shortage of copper is expected to become worse during 1941, according to Mr. Stettinius. At the same time, a civilian allocation program for copper was issued by Leon Henderson, administrator, OPACS. The order has the effect of giving all defense needs first call on the copper supply.

Lead — Demand continued active last week as the trend of substituting lead for scarcer metals increased. May shipments rose to the unusually high level of 90,000 tons.

Zinc—OPACS is expected soon to issue an order which will control civilian uses of zinc. This month OPM takes 22 per cent for distribution to ordnance work and the producers can allocate the balance without restriction.

Tin—Prices rose to 52.62½c on Friday as sales increased in domestic and Far Eastern markets. Activity in the latter market reflected increased tension in the Netherlands East Indies producing section.

Aluminum—William S. Knudsen, director general of OPM, disclosed on Thursday that the government is planning on a top production of 1,600,000,000 pounds of aluminum annually in order to carry out a proposed plane building program. Production totaled 412,560,000 pounds in 1940 and came to 52,000,000 last month.

Pacific Coast

Seattle — Shipbuilding construction on Puget Sound is approaching World war proportions, pending contracts insuring full activity for about three years. Maritime Commission has awarded Seattle-Tacoma Shipbuilding Corp. additional contracts for thirty C-3 freighters to be laid down at the Tacoma plant, requiring about 60,000 tons of plates and 30,000 tons of shapes. This yard is now completing five C-I cargo carriers, has contracts for five navy tankers and six other C-3 units. The company's Seattle yard is engaged in building 25 destroyers for the navy.

Rolling mills are working at capacity with heavy backlogs. With army and navy projects getting priorities, mills are finding difficulty in serving regular customers. Stocks are depleted and as fast as material is rolled it is delivered. Demand for merchant bars is so insistent that dealers have been unable to replenish stocks.

Fabricating plants are so crowded that they hesitate to bid on new work but are giving federal agencies every co-operation in furnishing materials required for national defense projects. Bids are in to Bonneville project for 850 transmission towers, tonnage unstated, for the Coulee-Covington line.

Several important cast iron pipe contracts are pending, including additional work at the Fort Lewis cantonment. Municipalities in some instances have had to post-

pone plans because of the inability of agencies to promise deliveries.

San Francisco—Most fabricators are centering attention on defense projects as they are practically assured that material can be obtained when needed. One company, through a general contractor who had secured a contract for a bridge in California for the state last November, has not yet received the necessary structural material and the state has extended the time limit instead of exacting the penalty for noncompletion.

The shape market was the most active one of the week and 4091 tons were booked, bringing the aggregate to date to 316,193 tons, compared with 89,307 tons for the corresponding period in 1940.

Movement of reinforcing bars continues in small lots. So far this year 46,570 tons have been placed, compared with 71,403 tons for the corresponding period in 1940.

Canada

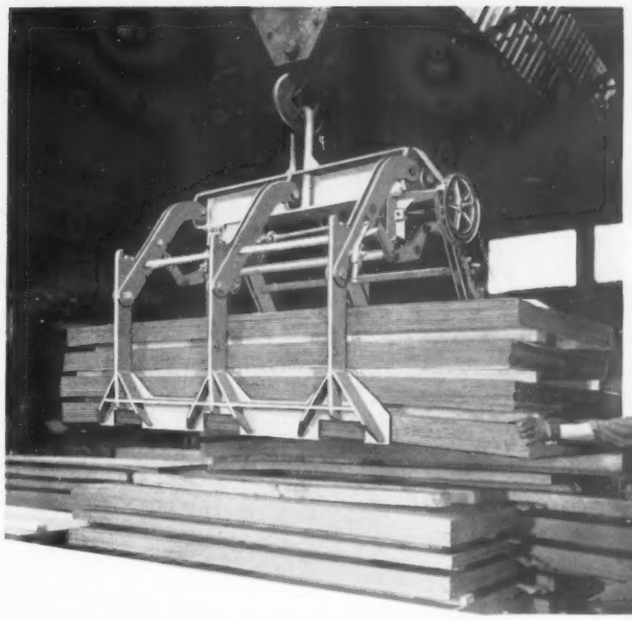
Toronto, Ont.—Specifications for steel are widely diversified and heavy. Some producers are avoiding orders, especially sheets and plates, without directly turning them down, and it is stated that most producers are booked to the end of the year. Inquiries indicate big tonnages of both plates and sheets are overhanging the market, chiefly on war production account, quick delivery orders in small quantity lots are going to warehouse operators, and large tonnages to the United States. Canadian Locomotive Co., Kingston, is in the market for plates for locomotives, and orders also are pending from Montreal Locomotive Works, as well as for armor plate for tank construction.

While merchant bar orders are sufficient to take care of all production for some months buying continues at a record pace. War industry is absorbing almost the whole of present output with the result that ordinary requirements are given little consideration. Although war industries, under priority rulings, are receiving fair delivery, the quantity in many instances is not sufficient to maintain continuous capacity production.

An upward spurt was noted in structural steel awards last week, with lettings upwards of 15,000 tons. Fabricators in most localities are running at capacity and report steady piling of orders. Reinforcing steel also is in heavy demand and one producer which has been giving delivery in one to two weeks, now is accepting business for delivery late in July and August.

Flood Cuts Coking Coal

Cleveland—Steel companies depending for coking coal on mines temporarily shut down by Wednesday's cloudburst in Western Pennsylvania so far have tried in vain to safeguard their position in coke. This is because high-grade metal-



15 TONS *safely*

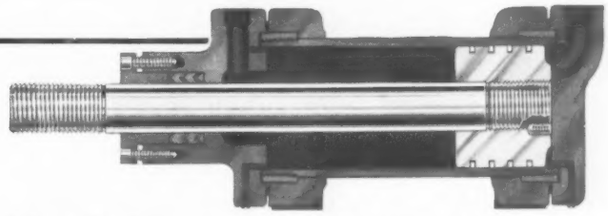
Here is a load of loose sheets of steel being handled with a C-F Sheet Lifte under "one-man" control with utmost safety for both man and material.

C-F Sheet Lifters with their capacity for careful handling of materials, with their mechanical safety and their speed and wide utility in operation, provide many industries with a better means of lifting, carrying, loading, storing, and stacking. If you have hard-to-handle, awkward, heavy products . . . simplify the handling problem with C-F Sheet Lifters.

Write today for Bulletin SL. 18

CULLEN-FRIESTEDT CO.,
1308 S. KILBOURN AVE. CHICAGO, ILLINOIS

Simpler–Stronger
HYDRAULIC CYLINDERS



Take full advantage of hydraulic power simplicity, and ease of control with Hannifin high efficiency cylinders. The patented no-tie-rod design means a simpler and stronger cylinder, easier to apply to any type of hydraulic power operation. Mirror finish honing gives a straight, round, perfectly smooth cylinder bore for efficient piston seal and minimum fluid slip. Hannifin hydraulic cylinders are built in a full range of types and sizes, for any length stroke. Seven standard mountings, with or without cushion. Write for Bulletin 35-S.

HANNIFIN MANUFACTURING COMPANY
621-631 South Kolmar Avenue Chicago, Illinois

HANNIFIN *hydraulic* **CYLINDERS**

lurgical coal cannot be bought on the market in quantities. The situation is aggravated by the extent to which coal and coke reserves were depleted during the recent coal strike.

Steel in Europe

Foreign Steel Prices, Page 113

London—*(By Cable)*—Practically all steel and iron works in Great Britain are working at capacity. The supply position is satisfactory. Demand for structural steel is heavier and consumption of special steels is increasing. Home consumption of tin plate is larger and exports continue greatly restricted. Black and galvanized sheets are active for domestic use and little is available for export.

Equipment

Cleveland—General trend is of continued brisk demand, though some builders and dealers report temporary quiet. Sellers are often handicapped by rapidly-changing theories of warfare which cause frequent redesigning of plans by the Army and Navy. The sinking of the HOOD and BISMARCK, for instance, have caused some lack of confidence in naval power and placed more emphasis on aircraft, which affects the machine tool trade.

One of the latest tooling propositions is for the manufacture of a new gun, a six-pounder, with barrels 112 inches long, firing a 2¼-inch shell, to be used both on army tanks and as an anti-tank gun. This weapon is now being manufactured in Canada but some American ordnance plants will also produce it.

In defense tooling principal emphasis now is on tools for turning out more aircraft and naval destroyers, regarded as first line of defense.

The Ordnance Office of the War Department has just ordered 200 emergency shell lathes, most of which will presumably be furnished by Texas machine tool builders, it is learned here. The tools were designed by the National Machine Tool Builders' Association.

Construction and Enterprise

Ohio

CLEVELAND—Third building in airplane engine research laboratory at Cleveland airport will be service building, one story, 210 x 232 feet and 50 x 90 feet. It will house machine, sheet steel, pipe, woodworking, electrical and heat treating shops, metallurgical and instrument laboratory, etc. National advisory committee for aeronautics, E. R. Sharp, administrating officer, Langley Field, Hampton, Va., will advertise for bids about June 15.

CLEVELAND—Marquette Metal Products Co., 1145 Galewood drive, is building a storage addition 25 x 145 feet, costing about $2500, and will release part of present plant for production purposes. Herbert Gleitz is president.

CLEVELAND — Clark Controller Co., 1146 East 152nd street, Prentice C. Clark, president, is building machine shop addition with 2900 square feet floor space as part of expansion program. J. L. Hunting Co., Ninth-Chester building, has general contract

CLEVELAND—American Fork & Hoe Co., Keith building, will build warehouse with 10,700 square feet floor space at its plant at Geneva, O. C. B. Rowley & Associates, Keith building, have asked for bids.

CLEVELAND — Thompson Aircraft Products Co., F. C. Crawford, president,

Additional Construction and Enterprise leads may be found in the list of Shapes Pending on page 121 and Reinforcing Bars Pending on page 123 in this issue.

is considering government request to double facilities of new $11,000,000 plant now under construction.

CLEVELAND—Brush Beryllium Co., 3417 Chester avenue, will build new manufacturing building with 9700 square feet floor space at Lorain, O. L. A. Burgett Co., foot of Eighth street, has contract and is just completing storage building at First and Hamilton streets.

MEDINA, O.—Bids will be received in July for sewer and water systems costing about $150,000. E. D. Barstow, 31 North Summit street, Akron, O., is engineer.

NILES, O.—Youngstown Steel Car Corp., Hunter street, will build an addition, manufacturing space to be increased 6000 square feet and office space 2500 square feet. Raymond Diehl is manager.

TOLEDO, O.—American Propellor Corp., newly organized subsidiary of Aviation Corp. of America, 420 Lexington avenue, New York, has named Austin Co., 16112 Euclid avenue, contractor-engineer for a $26,500,000 airplane propellor plant here, first unit of which will cost $8,700,000. William F. Wise, executive vice president of parent company, is president of the subsidiary. Wayne Eddy is Toledo manager.

Connecticut

FAIRFIELD, CONN. — Rolock Inc., Southport, Conn., R. P. Wells, president, will build a plant on Kings Highway costing about $40,000.

WATERBURY, CONN.—Scoville Mfg. Co., Mill street, will build a one-story 135 x 310-foot addition costing $130,000. C. A. Kendall, company engineer, is in charge.

Massachusetts

ASHLAND, MASS.—Warren Telechron Co. is building a one-story 50 x 100-foot addition to cost $50,000, with equipment.

TAUNTON, MASS.—General Electric Co. is improving plant here for production of plastic molded parts. Plant has been idle since 1929.

WORCESTER, MASS.—Plans are ready at mayor's office, city hall, for a one-story 25 x 25-foot pumping station in

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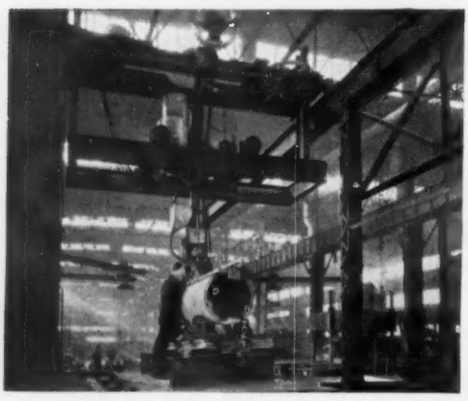

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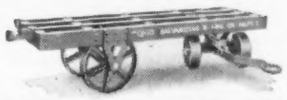

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the Ballard street district, to cost about $25,000. E. R. Perry, city hall, is engineer.

WORCESTER, MASS.—Thompson Wire Co., 115 Stafford street, has plans for a one-story plant 65 x 180 feet, to cost about $40,000.

New York

JAMESTOWN, N. Y.—Jamestown Malleable Iron Corp., Tiffany avenue, has let general contract for a plant addition to Warren Construction Co., 335 Steele street, to cost about $40,000.

SYRACUSE, N. Y.—Crouse Hinds Co., Wolfe street, has let general contract for a 60 x 500-foot foundry to J. D. Taylor Construction Co., 115 South Salina street, costing about $100,000. T. W. Gaggin, First Trust & Deposit building, is architect.

New Jersey

BENDIX, N. J.—Bendix Aviation Corp., South Bend, Ind., will build a magnesium foundry at Bendix airport at cost of about $440,000.

Pennsylvania

ALTOONA, PA.—Linde Air Products Co., 20 East Forty-second street, New York, will build a group of manufacturing buildings, to cost over $100,000.

BELLEFONTE, PA.—Tital Metal Co. will build a one-story plant addition for metal products, to cost about $190,000, with equipment.

ERIE, PA.—Erie Resistor Co., G. R. Fryling, president, 64 West Twelfth street, has plans by E. S. Phillips, architect, 228 Commerce building, for a one-story plant 150 x 210 feet.

LEBANON, PA. — Lebanon Steel Foundry Co., Front street, will build a foundry 44 x 267 feet, general contract to John H. Wickersham, 14 South Duke street.

NEW CASTLE, PA.—City and county, Robert M. White, city solicitor, has bought for $25,000 the local plant of Carnegie-Illinois Steel Corp., about 20 acres and buildings, to be divided into industrial sites.

SCRANTON, PA.—Bryan Engineering Co., J. G. Bryan in charge, will build a one-story 100 x 100-foot plant at Twenty-seventh and Main streets, Dickson, a suburb, to cost $40,000.

TRAFFORD CITY, PA.—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., will build a two-story foundry and office building, 107 x 286 feet.

Michigan

CHELSEA, MICH. — Federal Screw Works has started an addition of 11,000 square feet, 66 x 134 and 38 x 76 feet, general contract to Henry Bender, Toledo, O.

DETROIT — Carrier Engineering Co. has been incorporated with $35,000 capital to plan and design machinery, by Edmund T. Carrier, 201 Hoffman building, Detroit.

DETROIT—Anchor Tool & Die Co., 3327 East Vernor highway, has been incorporated with $12,000 capital to manufacture tools and dies, by Ernest R. Reinsch, 18674 Muirland avenue.

DETROIT—Century Mfg. Corp., 5401 Wabash avenue, has been incorporated with $20,000 capital to manufacture sheet metal products, by Edward Sanders, 15830 Livernois avenue.

DETROIT—Carboloy Co. Inc. has given general contract to O. W. Burke Co., Detroit, for an addition to its plant.

DETROIT—Precision Boring Co. has given general contract to Cunningham-Rudy Co., Detroit, for a factory building. Lyndon, Smith & Winn are architects.

IRONWOOD, MICH.—Plans have been approved by the state for construction of a sewage disposal plant costing $122,000. A. G. Wood is city manager. Suhr, Berryman, Peterson & Suhr, 130 North Wells street, Chicago, are engineers.

MUSKEGON HEIGHTS, MICH.—Shaw-Box Crane & Hoist division of Manning-Maxwell-Moore Inc., has started construction of a plant addition.

MUSKEGON, MICH. — Kaydon Engineering Corp., 3019 Lake Shore drive, has been incorporated with $50,000 capital to deal in machine parts by Harold Frauenthal, 502 West Ironwood drive, South Bend, Ind.

ONTONAGON, MICH.—City, Dorothy O. Aubrey, clerk, plans construction of sewage disposal system, now under discussion by city council.

SAGINAW, MICH.—Saginaw Stamping Tool Co. is having plans made by Clarence Merrill, Saginaw, for a plant addition 60 x 110 feet.

Illinois

CHICAGO—Eagle Grinding Wheel Co., 2519 West Fulton street, is building an addition, two stories, 17 x 81 feet, increasing capacity about 25 per cent.

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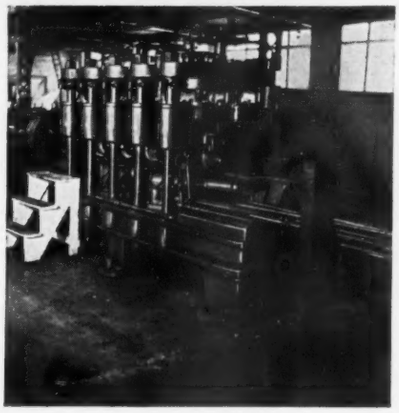

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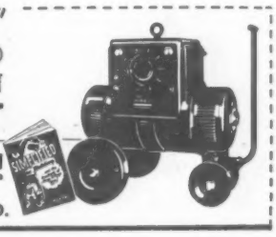

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Co. 2251 West St. Paul avenue, plans two-story addition 125 x 200 feet, costing about $30,000. Cohen & Kogen, 217 West Ontario street, are architects.

CHICAGO—David Architectural Iron Works Inc., 2020 West Walnut street, is building a plant addition and a one-story office addition.

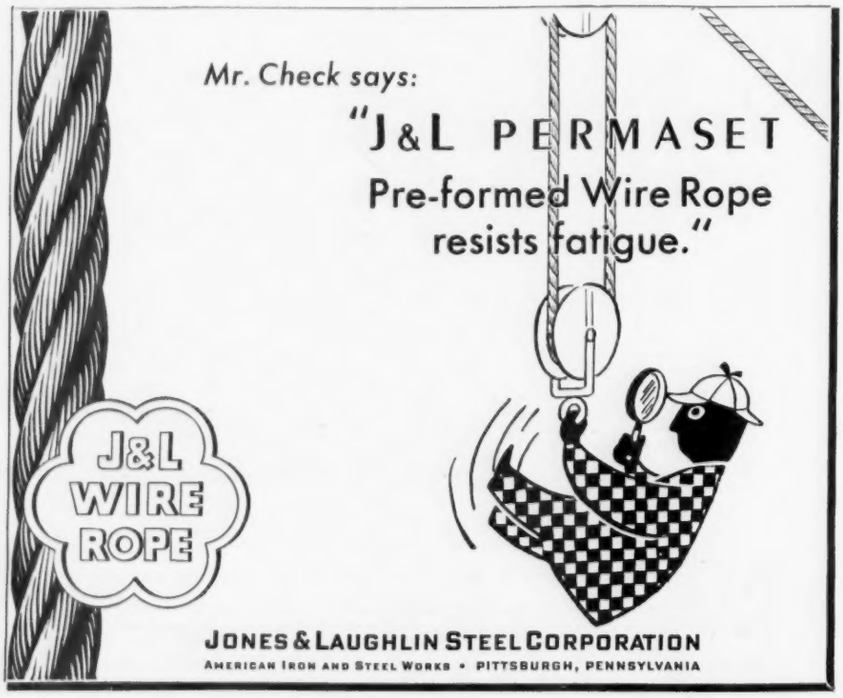
CHICAGO—Wykoff Drawn Steel Co., 3200 South Kedzie avenue, is building a small addition and will buy some equipment as part of an expansion program for defense purposes.

CHICAGO—Atlas Forging Co., 1443 South Fifty-fifth court, Cicero, Ill., will build a one-story machine shop addition 45 x 70 feet. Algot B. Larson & Co., 3837 West Lake street, are general contractors.

ROCKFORD, ILL.—Barber-Colman Co., machine tool manufacturer, will build a raw materials storage warehouse 175 x 240 feet, one story, costing about $50,000.

ROCK ISLAND, ILL.—Bear Mfg. Co., Will Daman, president, manufacturer of auto safety testing equipment, will build a two-story addition 60 x 150 feet, to house $30,000 worth of new equipment yet to be purchased.

WOOD RIVER, ILL.—Standard Oil Co. of Indiana has given general contract for an electric power plant costing $1,000,000 at its refinery to Dravo Construction Co., Pittsburgh.



Kentucky

HAZARD, KY.—Kentucky & West Virginia Power Co. plans expansion of its steam-electric generating station, including installation of 25,000-kva. turbo-generator unit and accessories and high-pressure boiler, to bring station to 49,000-kva capacity. Cost estimated at $2,500,000.

South Carolina

CHARLESTON, S. C.—Pittsburgh Metallurgical Co. Inc., C. F. Colbert Jr., president, Highland avenue, Niagara Falls, N. Y., will build an alloy plant, general contract to G. M. Guest & Co., Anderson, S. C. Cost will be about $1,000,000.

Tennessee

MEMPHIS, TENN.—United States engineer's office is taking bids for Cypress Creek pumping station, the second of six to be built in the Wolf river flood control project.

MEMPHIS, TENN.—Southern Forge & Foundry Co. Inc., J. W. Dyess, vice president and general manager, 502 Bodley avenue, has been formed with $100,000 capital to manufacture gray iron castings, with plans to make steel castings and forgings later.

ROCKWOOD, TENN.—Tennessee Production Corp., Nashville, Tenn., will recondition blast furnace at Rockwood plant for production of ferromanganese. RFC loan of $75,000 additional has been granted for the purpose.

West Virginia

RIVESVILLE, W. VA.—Monongahela-West Penn Public Service Co., Fairmount, W. Va., has approved plans for an addition to its plant here, including installation of a 35,000-horsepower turbo-generator unit and accessories and a high-pressure boiler. Total cost estimated at $3,000,000.

SANDYVILLE, W. VA.—Anchor Hocking Glass Corp., Lancaster, O., will build a natural gas pipe line from gas fields near Sandyville to supply two glass manufacturing plants near Lancaster, at cost of about $1,000,000.

Missouri

ST. LOUIS—Carter Carburetor Co., 2838 North Spring avenue, has given contract to L. O. Stocker Co., Arcade building, for three-story 122 x 140-foot addition at 3636 Dodier street.

ST. LOUIS — City has appropriated funds for 8½ miles of watermains from South St. Louis to Koch, Mo., via Jefferson Barracks, military reservation. Line will involve 12, 16 and 20-inch pipe.

Oklahoma

OKLAHOMA CITY, OKLA. — Steel Erectors Inc. has been incorporated with 2500 shares $100 par value and $10,000 paid-in capital, by L. J. Webster and associates.

Wisconsin

EAU CLAIRE, WIS.—National Pressure Cooker Co., manufacturer of canning and cooking equipment, has let general contract to Hoeppner-Bartlett Co., for two-story plant addition 43 x 78 feet.

LA CROSSE, WIS.—City, F. L. Kramer, clerk has plans and will take bids soon on an iron removal plant costing $16,400. J. H. Barth is city engineer.

LA CROSSE, WIS.—Trane Co., manufacturer of heating and air-condition-

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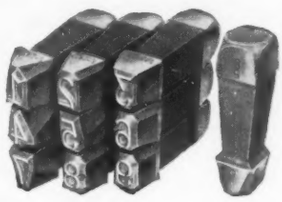

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ing equipment, is building its third plant addition in two years, 84 x 162 feet. Company is furnishing much equipment for army and navy purposes.

MILWAUKEE — Geuder-Paeschke-Frey Co., manufacturer of sheet metal stampings and steel containers, has let contract to Meredith Bros. for a one-story plant addition 59 x 131 feet.

OSHKOSH, WIS.—Wisconsin Axle Co., manufacturer of truck axles, is building a plant addition containing 20,000 square feet floor space.

RACINE, WIS.—Modine Mfg. Co., manufacturer of heating and ventilating equipment, plans one-story plant addition. Ellis A. Klinger, Racine, is architect.

READSTOWN, WIS.—Village, R. Sheffield, clerk, will take bids soon on sewage disposal plant and watermains costing $270,000. Davy & Davy, La Crosse, Wis., are engineers.

SPENCER, WIS.—WPA has allotted $76,400 to the village, R. H. Hermanson, clerk, to aid financing sewage disposal plant and sewer system, costing about $100,000. Davy & Davy, 502 Main street, LaCrosse, Wis., are engineers. (Noted March 24.)

STEVENS POINT, WIS. — Whiting-Plover Paper Co. will award contract soon for three-story boiler plant addition 32 x 52 feet, to house additional boiler house equipment. Helmick, Edeskuty & Lutz, Essex building, Minneapolis, are engineers.

WEST ALLIS, WIS.—Allis-Chalmers Mfg. Co. will let contract soon for a two-story plant addition to building No. 7, 145 x 224 feet. Carl E. Meyer is company architect.

WEST ALLIS, WIS.—Wisconsin Motor Corp., manufacturer of gas engines, has given contract to Klug & Smith, Milwaukee, for a one-story plant addition 82 x 60 and 30 x 80 feet.

Minnesota

EVELETH, MINN.—City, Arthur F. Rye, clerk, is taking bids to June 17 on electric-driven pumping units at St. Marys lake, pumping station.

HOFFMAN, MINN.—WPA has allotted $60,229 to aid in financing a sewage disposal plant costing $85,000. An election will be held soon on an issue of bonds. L. F. Studlein is village clerk.

LONG PRAIRIE, MINN. — Village, George M. Tronshue, clerk, is taking bids to June 10 for sewage treatment plant and sewer system. G. M. Orr & Co., 542 Baker Arcade building, Minneapolis, are engineers.

MANKATO, MINN.—Continental Can Co., Wyatt W. Taylor, representative, has option for 20 acres of Mankato fair grounds for plant costing $300,000.

MINNEAPOLIS—Cheney Foundry, 1517 South Third street, George W. Cheney, president, has given general contract to Neibur & Evenson, 2942 Newton avenue North, for a one-story foundry addition 40 x 70 feet.

MINNEAPOLIS—St. Paul Hydraulic Hoist Co., 2207 University avenue, S. E., will build a one-story 54 x 80-foot hoist plant addition, general contract to R. J. Vrooman, 53 West Jackson boulevard, Chicago, to cost about $70,000.

ST. PAUL—American Hoist & Derrick Co., manufacturer of derricks, hoists, etc., has let general contract to William Baumeister Construction Co., Pioneer building, for a one-story plant addition 100 x 195 feet. C. H. Johnston, Empire Bank building, is architect. (Noted April 28.)

Texas

HOUSTON, TEX.—Emsco Derrick & Equipment Co. will build a one-story 50 x 325-foot addition costing $40,000.

Kansas

EL DORADO, KANS.—Kansas Gas & Electric Co., care Murray Gill, Topeka, Kans., and Nebraska Power Co., Omaha, Nebr., plan construction of high-voltage transmission 265 miles long to interchange minimum of 25,000 kilowatts between the two systems, at cost of $1,000,000.

KANSAS CITY, KANS.—Board of public utilities, James D. Donovan, manager, is taking bids to June 11 for power plant equipment, including two 60 million gallons per day low-pressure pumping units and circulating water valves. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., are engineers. Estimated cost of $150,000.

TOPEKA, KANS.—Kansas Power & Light Co. has let general contract to George Senne Construction Co. for a boiler plant addition 50 x 80 feet, to cost $60,000, exclusive of equipment. Black & Veatch, 4706 Broadway, Kansas City, Mo., are engineers.

North Dakota

BOTTINEAU, N. DAK.—North Central electric co-operative has been organized and will apply for $225,000 REA funds to build 300 miles rural transmission lines. H. T. Nordslette, Souris, N. Dak., is secretary.

MILNOR, N. DAK.—R. S. R. Electric Co-operative Inc., Ray Haren, manager, has been given $160,000 REA funds for 171 miles of rural electric lines.

ROLLA, N. DAK.—City, A. R. Beardsley, auditor, plans municipal electric light plant to cost about $45,000. P. W. Barnes, Valley City, N. Dak., is engineer.

South Dakota

ABERDEEN, S. DAK.—James River Valley Association, Charles Wolter, president, has employed Buell & Winter Engineering Co., Sioux City, Iowa, to plan rural transmission lines in Brown, Spink and Faulk counties to serve 450 customers.

Iowa

GRUNDY CENTER, IOWA—Issue of $200,000 bonds has been approved at special election, to finance municipal electric light plant. Helene C. Heiberger is city clerk. (Noted May 12.)

California

EL MONTE, CALIF.—Littlefuse Corp., Chicago, is building a manufacturing plant near Southern Pacific station, with 20,000 square feet floor space, costing about $47,000.

LOS ANGELES — Consolidated Steel Corp., 5700 South Eastern avenue, will build a warehouse addition 76 x 180 feet and office building 40 x 140 feet at cost of about $43,500.

LOS ANGELES—Los Angeles Shipbuilding Co. is undertaking expansion program to cost $800,000, including mold loft and warehouse 170 x 620 feet, paint shop 50 x 100 feet and blacksmith shop 60 x 124 feet.

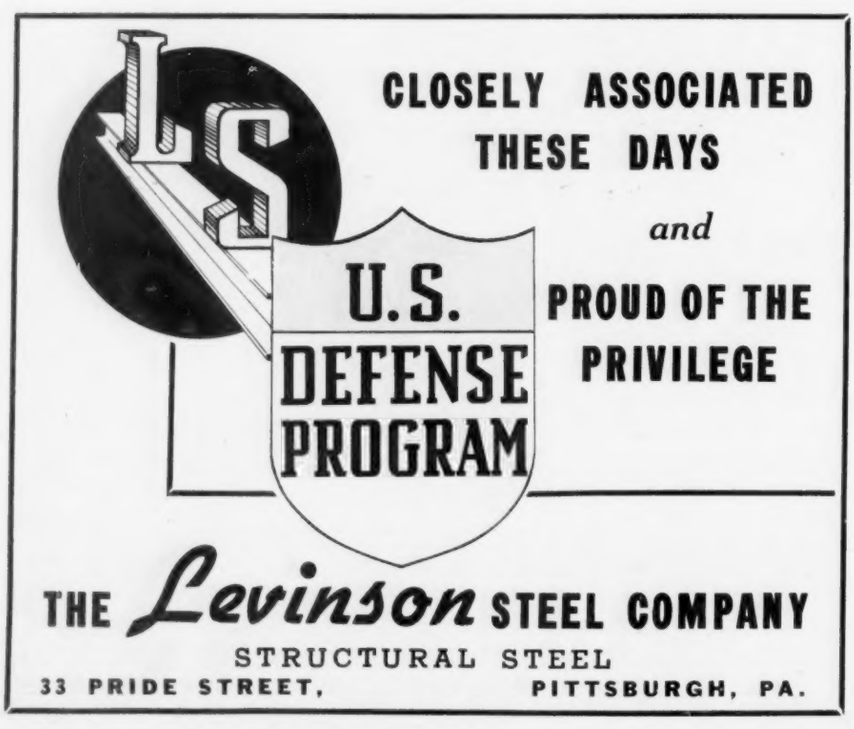
Oregon

PORTLAND, OREG.—Bonneville project announces Electro-Metallurgical Co., subsidiary of Union Carbide Co., New York, has contracted for 13,000 kilowatts of electric power to operate its ferroalloy plant here.

Washington

KELSO, WASH.—City is considering a $60,000 water system improvement and will hire consulting engineer to make survey.

VANCOUVER, WASH.—Vancouver Dry Dock & Construction Co. has been incorporated with $11,000 capital by William Einzig and associates.



360 SHELLS PER HOUR

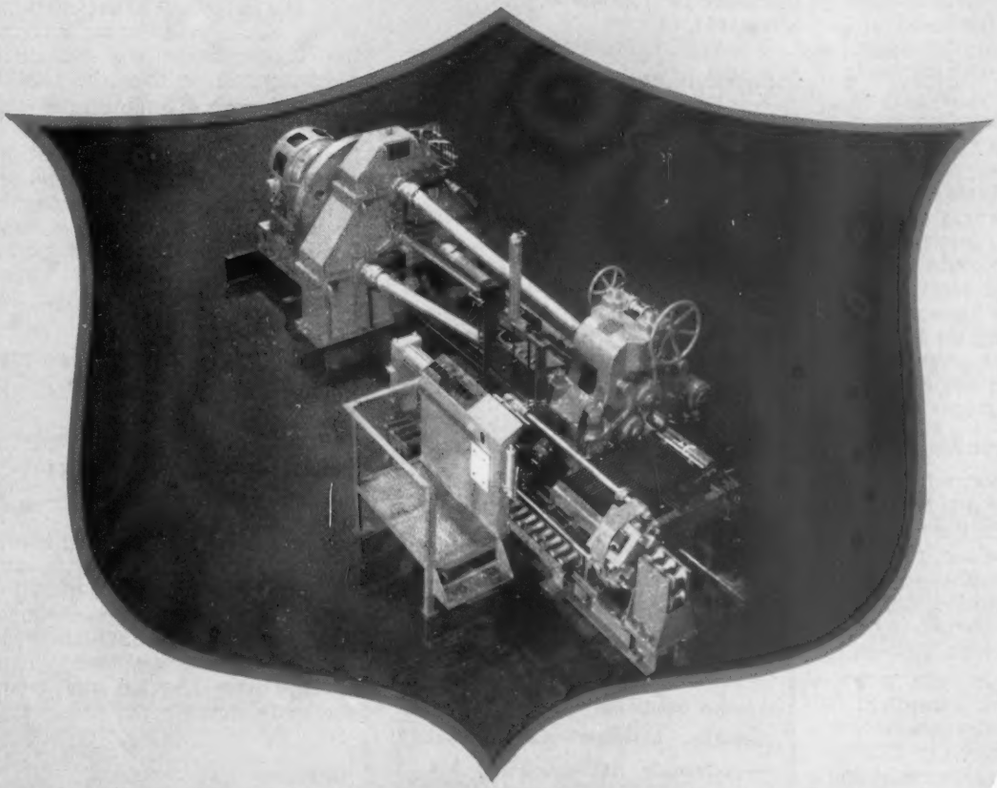
BY THE

WITTER PROCESS

PATENTED

THE WITTER PROCESS FOR CROSS ROLLING SHELLS NOT ONLY STARTS WITH 25% LESS STEEL BUT ELIMINATES THE ROUGH MACHINE TURN WHILE GIVING SUCH HOURLY PRODUCTIONS AS . . . .

360 75 m.m.	240 105 m.m.
300 90 m.m.	160 155 m.m.
200 5" A.A.	



SALEM ENGINEERING CO., SALEM, OHIO

SALEM ENGINEERING COMPANY

ADVERTISING PAGES REMOVED

Comments FROM... STEEL's Readers

Warned On Defense "Rackets"

To the Editor:

For years we have had a strong Manufacturers' Club, as a division of the Mansfield Chamber and this has helped considerably in the present crisis. Last September we called a meeting of all manufacturers in north central Ohio, within a radius of 30 miles of Mansfield, to discuss problems.

We have been interested in the vocational training day and night at the local high school and we organized locally the advance classes in engineering defense training as sponsored by the engineering school of Ohio State University. About 100 are enrolled. We also helped organize the non-college civilian pilot training program at the local airport.

We led the field with defense questionnaires to our 45 largest industries and placed this information, with a comprehensive industrial survey, in the hands of officials at our Federal Reserve Bank in Cleveland. When army engineers came to Mansfield recently to determine if the standard M-48 fuse could be produced here, we got our local manufacturers together. We have also informed our local industrial men, in line with Washington's desires, not to take help from each other and to use the Ohio Employment Agency.

Against Big Inventories

We have kept our town folks informed on a number of so-called defense rackets which the present crisis is bound to produce, and we have warned merchants against building up big inventories and advertising that people should lay in large stocks of provisions.

We are busy now in setting up Richland County and Mansfield's United Service Organization. Our quota, excluding Shelby, is $6500. We are also organizing to assist in the sale of defense bonds.

Our approach from the beginning has been, first, our patriotism to our country and, second, more business for Mansfield. We have a large number of smaller plants in Mansfield—not the big-name companies, with the exception of Westinghouse, which through its Pittsburgh office has received much defense business. Because of this, we have been slow in feeling the upswing.

However, our industrial employment reached 12,148 this month and our welfare load for the county fell to 417 cases. These figures represent the best business picture in many years. In fact, we are now beginning to experience a labor and housing shortage.

JOHN G. ROUTZON
Secretary-Manager,
Chamber of Commerce,
Mansfield, O.

Induced Many To Use Arc Torch

To the Editor:

I would like to thank STEEL and G. W. Birdsall for the able presentation of the material that I submitted concerning the arc torch. We have had a large number of inquiries regarding it and outfitted several manufacturing plants with the torch.

FRANK W. SCOTT
University of Minnesota,
Minneapolis

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for with-holding his identity. Letters should be brief—preferably not exceeding 250 words

Military Terms in Everyday Talk

To the Editor:

A few years ago many of us got a chuckle out of the headline "How to wash an elephant." There doubtless would have been equal amusement over the title "Factors to be Considered When Making Tanks." Yet as demonstrated in Mr. Birdsall's article in your May 5 issue, the subject today is serious and important but also interesting to anyone aware of war.

Between wars we business people who have no connection with military affairs develop quite an affection for the language of battle. There is a good deal of talk about the sales *drive*, the advertising *barrage*, the expectation that every man in the *ranks* will do his duty and the determination to "carry the company banner over the top."

Now we have trouble in stopping the figurative use of these terms and in learning to realize once more what their original, literal and practical meanings are. A magazine such as yours, however, is a rule book for armament and perhaps that's why some of us who have no direct relation to steel find STEEL nevertheless readable.

CARLETON HEALY
Detroit

Thickness of Zinc Coatings

To the Editor:

I am not anxious to be drawn into a discussion of electrolytic versus hot dip galvanizing; but all the A. S. T. M. tests and statements bear out the fact that—regardless of the method employed in zinc coating—the heavier the coating, the more durable the product.

ERNEST V. GENT
Secretary,
American Zinc Institute,
New York.

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Vol. 108, No. 24, June 16, 1941, issue of STEEL, published every Monday at Cleveland, O. Entered as second-class matter at the postoffice, Cleveland, O., under act of March 3, 1879. U. S. and Canada, 1 year $4; 2 years $6; foreign countries, 1 year $10; Current issues, 25c